The Builder.

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Apprenticeship.

THE Technical Education Board held last year a systematic inquiry into the actual state of apprenticeship in the various trades in London, and collected from various employers of labour their views in regard to the possibility of developing the system in the future. The general results were published a few weeks ago in the *London Technical Education Gazette*, and form an interesting practical summary of the situation.

The proportion of recruits entering the building trades as apprentices is very small at present, only 80 among a total of about 12,000 persons; and four firms, each employing about 1,000 hands, had not an apprentice among them. The reasons given for this are not very different from the reasons which have recently been given for the bad condition of the building art generally. We are told of the engrossing nature of London businesses on their commercial side, the extensive use of machinery, the absolute necessity of utilising all available space for securing the maximum productive power; and hence, as a natural sequence, the reluctance of employers to undertake moral responsibilities which they know that they cannot satisfactorily discharge. All this is the same thing over again as Mr. Lethaby's complaint of last week. It is another of the results of the competition system. Everything is cut so close by that system that the contractor can have no time or thought for anything except how to get the work done fastest and cheapest so as to secure a margin of profit; and not only is there no opportunity left of producing good work, but there seems also to be no time or inclination even to teach any one his trade. Everything is at high-pressure speed, and the manager of the shop has not time to think of apprentices and will not be troubled with them. For one of the additional reasons given is that the question of discipline becomes a difficulty. If a boy apprenticed for a term of years is guilty of misconduct, and seems a confirmed bad bargain, the employer has only a legal remedy which is troublesome and expensive, and the application of which is consequently avoided; and the same applies if an apprentice, eager for better wages, throws over his articles and engages himself elsewhere. The master has not time to trouble himself about the necessary legal machinery, and consequently prefers to avoid a system in which he will not be exposed to these complications.

The "learner" is however taken by many who will not take the apprentice. The "learner" is a kind of free apprentice; he is there for the same purpose as the apprentice, but he is not bound, and therefore can be dismissed at a moment's notice for misconduct, a condition which naturally renders him a good deal more amenable to discipline. The "learner" sometimes seems to get as much assistance and training as he probably would if he were a regular apprentice; in other cases (and we should suspect that these were the majority), he merely "picks up" what he can. This, it will be admitted, is a state of things which offers a very poor prospect for the improvement of work in building. The information furnished in regard to the bricklaying trade especially* is very unsatisfactory reading, and serves no doubt to account for the character of a good deal of the brickwork that is to be seen in these days. Learners, we are told, are admitted without agreement of any kind, "many being raw boys or boy labourers brought in through speculating builders, while others are often sons of journeymen." The common bricklaying is picked up by these learners, who are frequently put to work on the inside wall; a truly characteristic method of managing. There is a strong opposition in the trade to adult labourers advancing to the rank of journeymen, but they manage to escape to some extent the vigilance of the journeymen; and the labourer, "having picked up some knowledge of bricklaying with one firm, frequently obtains employment in another where, calling himself a bricklayer, an opportunity is afforded of doing ordinary brickwork." The grammar of this sentence is rather novel, but the complaint is a very old one; we heard of it in nearly the same terms a quarter of a century ago.

In spite of the objection of employers to taking apprentices under the existing state of things, it appears however that some of them have a very decided opinion in favour of the system, and would be very glad to adopt it more largely, and assist in its re-development, if the circumstances under which it would have to be carried out were modified. The paragraph in the Report in which this point is stated is very important, and should be as widely read as possible, and therefore we quote as it stands, calling particular attention to the sentence which we have printed in italics:—

"It was admitted on all hands that something should be done to improve the condition of the London workmen as regards general knowledge and skill. All the firms waited upon showed a keen desire to promote the success of the Board's work, and many of them testified to the value of the technical instruction now being provided in the various schools and classes; *but there exists a deep-rooted belief in apprenticeship as being the best means by which a boy can learn his trade and eventually secure good wages, for it was often acknowledged that only those men who have served as apprentices are able to practise the trade in its higher branches.* If, however, any attempt is made to revive apprenticeship—and employers do not appear to be unwilling to co-operate to this end—all the circumstances of the case must be taken into account; there must be a wider recognition of the modern conditions of industry, a better understanding concerning agreements, especially as regards the discipline of lads, and — as bearing very directly upon this latter point—a revision of the scale of payment to apprentices. The reluctance on the part of employers to undertake the responsibilities connected with apprentices, already referred to, might perhaps be overcome if the present limitations of the workshop-training were more fully recognised under the indenture, while the discontent and consequent bad discipline among apprentices would, it is thought, be largely removed if the wages paid during apprenticeship were calculated upon a higher basis, say commencing at 10s. per week."

In regard to the difficulty of control of the apprentices, it is observed on another page of the Report that the least annoyance in this respect is experienced with those boys who are bound through various organisations, such as City Companies, Charity Trustees, Boards of Guardians &c. Of course the real explanation of this is that these are picked boys, selected by organisations which have made it a business to inquire into their character; and the only reason, as far as we

* The information about the various trades, included in the Report, appears to have been furnished by a number of large employers of labour, whose names, however, for reasons which one can easily understand, it has probably been thought better not to give.

can see, why the apprentices directly engaged by the employer should not turn out equally satisfactory is really the same difficulty already referred to, cropping up again viz.: that the employer is so completely occupied with the cares of a business carried on at almost ruinous competition, that he has no time to make inquiries, and takes the apprentice on chance. The Report suggests that it would be well if all apprentices were subject to the control of a board acting as an intermediary between employers and parents. This would certainly be likely to ensure a better stamp of character and education in the average apprentice than appears, from all accounts, to prevail at present.

Under the heading Carpenters and Joiners the Report affords some interesting remarks. The words "carpenter and joiner," it is observed, have lost their old meaning; "a carpenter used to be considered competent to produce a finished article from the raw material, and under the old apprenticeship system he was taught to do this; but now he is regarded as only capable of doing the rougher kinds of work, such as flooring joisting roofing. . . . The joiner, on the other hand, is a more skilled workman, as his outfit of tools indicates; the extensive use of machine-made joinery, however, threatens to transform the joiner into a wood-fitter." On this latter point, however, there is nothing to be said. Against the pretence of machine-made *ornament* we have always set our face, but it is perfectly absurd for any enthusiasts to suppose that wood-working machinery for the constructive portion of woodwork will ever be put aside now, to satisfy any theories as to what is good for the workman. It is however, quite right that apprentices should be taught to carry out their work by hand, as in this manner only can they really learn the subject; and the Report states that great care seems to be exercised in this matter among employers, and that, in spite of the difficulty arising from the prevalence of machinery, both "learners" and apprentices are afforded many facilities for learning handwork, one firm making it a rule to teach its apprentices to set out and prepare work entirely by hand. It appears that there is a larger amount of apprentices and learners in this trade than in most others, which is attributed to a desire to avoid the dirty work of some of the other trades; and indeed, what branch of building work can be more attractive and wholesome than joiners' work? It is also interesting to note that among the existing number of foremen and clerks of works four-fifths (so it is stated) have been joiners. As there is no particular reason why joiners rather than men of any other trade should be fitted to become clerks of works, the fact seems to imply that a considerable proportion of the cleverest apprentices or learners seek to enter this trade.

In the Masons' trade it is stated that apprentices and learners are taught under the direction of the foremen, and they are put to work with men specially selected for the purpose of assisting them to progress. Perhaps this is to some degree a mutual benefit; it is noted in the general remarks in the Report that some firms consider that a few industrious learners have a very good effect in the shop, the questions as to "how" and "why" having the effect of stimulating the attention of the older hands to the principles of their work, and keeping them from running too much into a mechanical groove. Among the masons we are told again that there is great objection to labourers advancing to the rank of journeymen, and that they are as a rule restricted to the heavy and dirty work of a mason's yard, including the purely mechanical operation of rubbing stone. This, which is charged to the influence of the trades unions, is truly a beautiful and Christian principle—"keep another man from advancing in his work, lest he should interfere with me." The following sentence we do not quite understand:—"Labourers are not allowed to reclean masonry, a rough class of work which, it is alleged by employers, is not proper masonry, and which journeymen masons are not prone to undertake." Then by whom is it done?

In the Plastering trade legal indentures are the exception, but learners are admitted and work under the direction of foremen in many cases, though in other cases they only "pick up" what they can. The proportion of learners throughout all the trades who merely "pick up" their trade as they can seems to be, though not as large as it might be, a great deal too large. In regard to both plasterers and plumbers, both of whom work habitually in pairs, a superior man and an assistant or "mate" (as he is called in the plumbing trade), we find the same remark, that the superior worker is apt to be jealous of the advance of the other, and will not let him learn too much, and that in the plumbing trade the rather stupid style of "mate," who can only do routine work under order and will never advance beyond it, is preferred to the cleverer man: all which is rather melancholy reading.

In regard to the certificate of the Plumbers' Company the Board had collected some opinions. The firms which make plumbing a specialty are strongly in favour of the examination and registration, while others assert that the examination is often passed by a cramming system, that there are thoroughly competent workmen who could not pass the test (which is very likely), and that it affords no guarantee of good workmanship. Nevertheless, we may safely affirm that, while theory will not make a bad workman a good one, there is no good workman who will not be the better for a thorough understanding of the theory and principles of his work.

A few among the firms who were applied to gave their opinion in regard to instruction in technical schools and classes. The general feeling seems to have been that it is not of much value in a practical sense, and is too much of a mere exercise or recreation; moreover that the instructors are rarely sound practical men, "such as are secured as builders' foremen." We have heard from other quarters of the difficulty of getting precisely the right people for instructors in technical classes; and it may be questioned, supposing the class of men "such as builders' foremen" were secured, whether all or many of them would have the capacity for teaching. That is the *crux* in regard to technical classes; the practical man often cannot teach, and the man who can teach is not practical. One significant remark is made: "It is not wise to ask intending teachers whether or not they are member of trades unions, *as any preference for such members tends to exclude those who have excelled in the trade.*" The italics are ours. Could anything be more wretched than the conclusion implied? Throughout the whole inquiry there is constantly evidence of this hateful and contemptible spirit, which would keep down the cleverer man to the level of his fellows, lest his better work should compete too successfully with theirs. The Trades' Union is an organism for keeping work to an average level of ability and industry, beyond which the exceptionally able and energetic man is not to attempt to rise; the individual workman is jealous of his mate or his apprentice, and prefers a stupid one who will not be likely to learn to outshine him. There will never be, so to speak, any blessing on labour carried out in that spirit.

On the whole, the results of the enquiry undertaken by the Technical Education Board seem to show that all which has been lately said as to the advantages of the apprenticeship system for learning a trade is perfectly true, and is admitted to be so even by those who under the present circumstances cannot see their way to employ the system in consequence of their absorption in the financial success of their business, arising from the stress of competition. This latter will not be got rid of in a day, and it seems that some assistance will be given towards the adoption of the apprentice system by employers, if the practice is formed of taking apprentices through the recommendation of bodies which can make inquiries as to character, such as the employer cannot undertake. A great deal of the method which is employed with "learners" is equally applicable to apprentices, and the difference seems to be often only nominal, except that the learner can break off his course of learning and rush after a job with his education incomplete, while the apprentice is fortunately debarred from doing so. What is done for learners in some of the trades, apparently to a considerable extent, can just as well be done for apprentices. There can be no instruction much better than setting a learner or apprentice to work with and assist a competent workman, and learn his work as he goes on, by sight and handling at the same time. The practical drawback seems to lie in the fact that the elder workman is often jealous of any sign of his junior becoming too clever; and the only cure for this is a higher moral principle among workmen, when they may learn to be ashamed of the low standard inculcated by trades-unionism, that he serves the cause best who takes care not to do his work too well, and prevents others doing so. It can hardly be expected that there will be any widespread and permanent improvement in building work until the principle is again generally recognised among artisans, as once it was recognised, that the true honour in connexion with handiwork, as with all other work, consists in doing it as well as possible, not in being paid as much as possible for it.

ASIA MINOR.

THE new edition of Murray's "Handbook for Asia Minor"* has, according to a statement in the preface, been entirely rewritten, with the exception of some notes on the islands. As such books must be more or less compilations, the author in this case is described as the "Editor." There are no doubt many who could have produced such a book; but Sir Charles Wilson has many special qualifications. He was one of the first explorers in Jerusalem for the Palestine Exploration Fund—that was before Sir Charles Warren's explorations—and he has made a special study of the archæology of Jerusalem and the Holy Land, including Syria. He is one of the Executive Committee of the Palestine Exploration Fund; he has also been the "Director" to the Palestine Pilgrim's Text Society, whose publications have thrown so much light on the archæology of Palestine. This implies an extensive knowledge of at least one of the regions which borders on Asia Minor. As to Asia Minor itself, he has had special advantages for acquiring information; for this he is indebted to his having held the appointment of Consul-General in it for four years—from 1879 till 1882—during which time his official duties required him to travel over the most of the region. In the preface he acknowledges the assistance he received from many gentlemen who are familiar with Asia Minor; of these it is only necessary to mention here the names of Professor W. M. Ramsay, Mr. D. G. Hogarth, M.A., Mr. Phené Spiers, and Mr. G. Weber, of Smyrna, as these gentlemen have supplied information on archæology and architecture. Professor Ramsay, who is so well known for his archæological explorations in Asia Minor, has been Sir Charles's companion while visiting some of the archæological remains, and he contributes the description of the Phrygian monuments, "several of which he was the first to discover." Mr. Hogarth supplies the account of the Hittite sculptures at Euyuk and Yasili Kaya.

* "Handbook for Travellers in Asia Minor, Transcaucasia, Persia," &c. Edited by Major-General Sir Charles Wilson, R.E., K.C.B. London: John Murray. 1895.

The "Handbook" includes Armenia, Transcaucasia, and part of Persia and Mesopotamia; but these may be looked upon only as fringes of Asia Minor, whose boundary on the eastern side has always been slightly indefinite, and appears to be far from settled even in the present day. Should anyone wish to study the architecture of Armenia and Georgia, he will find accounts of Ani, Gori, and other places, where churches and rock-cut tombs and caverns exist. At Ani many thousands of these caves may be seen; and at Gori they are called "rock-cut dwellings," and said to be pre-Christian. The architecture of this particular region has not as yet received much attention in this country; the churches are classed as Byzantine, but they have features supposed to be derived from Sassanian or Persian, while at the same time they form links with the architecture of Russia.

The "Handbook" begins with a very able and concise historical sketch, the combined work of Mr. Hogarth, Professor Ramsay, and the Editor. It commences by stating that, "Asia Minor has been a thoroughfare for many conquerors, the abiding place of none, a debatable land on which the armies of East and West have fought, or marched towards continents beyond. Independent powers, 'Hittite,' Phrygian, Lydian, arose within its borders and disappeared again almost before the dawn of history; the Greeks fringed it with colonies, and slowly extended their influence on the central plateau, but lost more and more of their national character as they advanced. The Persians held it weakly, the Romans strongly, but always as a province; the Seljûk Kingdom of Rûm or Konia was nominally subject to the Grand Seljûk, and the Osmanli conquerors halted in the peninsula only for a few generations." This description is necessary, and should be borne in mind in attempting to form a correct idea of the remains of art in Asia Minor. Most of these transitory hosts built and sculptured in their own style while they ruled, and remains more or less extensive of each are still to be found. Some brought a style with them, others employed the style they found in the locality; under such circumstances there was little or no originality, and no style was carried on and improved upon so as to stand out from the others, and become celebrated. If we take Greek architecture as an illustration, there were some magnificent structures erected in this style, such as the temple of Artemis at Ephesus and the Mausoleum at Halicarnassus, but from what we now know of them, neither reached the high perfection of the same art in Greece. The sculptures from Pergamum may be seen at Berlin, and casts of a couple of them are in the South Kensington Museum, and they also fall far short of the higher standard. Still, the art and architecture of Asia Minor is of great value in many ways; its study will assist in tracing out the history of some styles and of the early forms of art, more particularly such as the Phrygian and Hittite, for it is in that region we expect to find additions to our knowledge regarding them.

As a guide to the whole of Asia Minor the book, of course, deals with the remains of architecture left by the Greek colonist along the coast of the Mediterranean; these have long been studied, and being well-known to our architectural scholars, need not be touched upon here. There are other styles which are known to exist, and as yet our knowledge of them is but fragmentary, consequently there is an interest attached to any details of these that may be found. The handbook speaks highly of the architecture of the Seljûks, as one of these styles of which our knowledge is limited. In the part of the introduction which is by Sir Charles himself, he writes thus,—"The Seljûk Sultans of Rûm, like the 'Great Seljûks' of the main line, were liberal patrons of art, literature, and science, and the remains of the buildings they erected are amongst the most beautiful and interesting in Asia Minor. At no period was Moslem art more brilliant. The *Medresses*,* with their quiet 'quads,' overlooked by the windows of the students' apartments, their small mosques, and their fine gateways, are not unlike, in plan, the Colleges at our Universities; the fortifications, the bridges, and the great khâns are built with a care and solidity that are almost Roman; and the mosques and tombs, though Persian in character, have a beauty of their own. Strong Persian influence is apparent in the freedom with which representations of animals and the human form are used in decorative details; and in the employment of glazed bricks of various colours in the palaces and in the minarets of the mosques. The beautiful buildings at Konia, Nigdeh, Kaisariyeh, Sivas, Amasia, Divrik, and other places well deserve the careful study of a trained architect, and the commemorative inscriptions which many of them bear would, if copied, probably throw light on the obscure history of the period." The Seljûk period began about the eleventh-century.

It is not exactly the purpose of a guide-book to treat scientific subjects in the manner one might expect in a special essay, and in this matter of the architecture of the Seljûks, it appears that its principal remains still require "the careful study of a trained architect," before we can know it properly. All that we do know is that it reached a high degree of excellence, that a large portion of it was constructed with crude brick, which was covered with glazed bricks and tiles, and that the style was of Persian origin. It was this Persian style which extended through Khorassan and Afghanistan, which the Mohammedan conquerors of India carried with them, and which was developed into the beautiful architecture that now makes Delhi and Agra so celebrated. This is a very wide space for one style to have covered; but we now know, in addition to this, that the Persian style grew out of the Sassanian, and the Sassanian at one time existed—probably with variations—all the way from Moab to Bokhara and Samarkand in Central Asia. The whole history of this style, from its first beginnings down to its latest developments in Asia Minor and India, will, when it is written, form a brilliant chapter in the history of architecture; but before this can be done trained architects will yet have to explore and collect material from more than one region in the old world.

There is another subject which to the art-student adds an interest to the archæology of Asia Minor; this is the existence of Hittite remains, which are found in a number of places, such as Boghaz Keui, Yasili Kaya, Euyuk, Ivris, and the pseudo-Sesostris figures at Karabel; and, from the Hittite characters discovered by Professor Sayce, the Niobe at the base of Mont Sipylus should perhaps be included among them. Some illustrations of these sculptures appear in the "Handbook," and references are made to Perrot and Chipiez's account, where they will be found well illustrated. The Phrygian sculptures are also illustrated in the "Handbook," but these, judging from the representations of lions on the Lion Tomb, are probably the same as the Hittite; the other tomb with the warriors, of which there is an illustration, may be much later. The "Handbook" agrees with M. Perrot in looking upon Hittite art as being only a rude offshoot of the art of Assyria. This is probable, but unless we have historical data to guide us, it is generally a most difficult question to decide whether monuments executed in a weak and seemingly primitive manner, belong to the first rude beginnings or to the rude endings of the particular style it is classed with. When the philologists have managed to read the Hittite hieroglyphics, we may then be in a better position to form a judgment on this point.

The lion tomb of the Phrygian monuments bears, in its design, a strong resemblance to the lions over the gate at Mycenæ, but the Phrygian animals are far inferior as works of art. This tomb was discovered by Professor Ramsay in 1881, but ten years before that Professor Ernest Curtius had prophesied that some future traveller would find in Phrygia the prototype of the Mycenæan gateway. This belief of the eminent scholar was no doubt derived from the legend that Pelops was a Phrygian, and the realisation of his words tends to show that at times some value may be derived from what has come down to us as mythical history.

The early religion of Asia Minor was the worship of a goddess, the personification of Mother Earth, from which the Artemis of Ephesus was derived. This goddess was known as Cybele, and the Niobe of Mount Sipylus is now accepted as a representation of her. Sir Charles Wilson, Professor Ramsay, and others are agreed upon this. It may be worth mentioning that the writer of this notice made what was perhaps the first sketch of the sculpture about twenty years ago, and the conclusion he formed was that it represents a male figure. This conclusion was derived from the total absence of breasts; and the head, which now is so worn that it is without features, appeared as if this part of the figure could not be restored without adding a beard. In the "Handbook" it is classed among the Phrygian sculptures.

In the present day, when architectural styles are being traced back to their earliest beginnings, it would be important to have some traces of the architecture of the Hittites. As yet, at least, with a very slight exception, the remains of this ancient people that have been discovered are all sculptures with representations of figures; and we are now tolerably familiar with their manner in this branch of art; but unfortunately, none of these sculptures contain any representations of buildings, and we are left almost entirely in the dark as to their structural productions. The slight exception referred to is found in the remains of what is assumed to have been a palace at Boghaz Keui, the ancient Pteria. A plan of the ruins is given, and the palace is indicated, but on a very small scale; Perrot gives a larger plan, and a drawing of them from Texier, from which the character of the remains can be made out. Now this plan, it is acknowledged, bears a family likeness to the plans of the palaces of Chaldea and Assyria; there is the same large space in the middle, surrounded by a number of smaller rooms, which we know were in the Assyrian examples covered with barrel-roofs, formed of crude brick. We also know that the walls of the Assyrian palaces were built of this material, and we may suppose that the Hittite walls were the same. The evidence for this is fairly satisfactory; one of the marked features of crude-brick construction was that of a stone foundation to prevent the sun-dried material from coming in contact with any chance accumulation of water that might soften it, and bring down the walls above. Texier's drawing shows this foundation wall of stones as still existing. There are said to be about two courses still visible, and on the top they remain tolerably level all over. Had the walls been wholly of stone, the ruin would not have remained so level all over as we now see it; and the stones that have fallen would have remained in heaps. At Euyuk—of which there is a plan in the "Handbook," but a drawing of the same, given by Perrot, conveys a more perfect idea—there exists the remains of another building, with the same foundation courses, and also level on the top where the crude brick began. These foundations leave scarcely a doubt as to the character of the material of which the walls upon them were constructed.

Beyond this little can be said about Hittite architecture; but as we live in an age of explorations, perhaps the future may produce further information. We have one reference to it which may be worth quoting here, as the words imply that it probably possessed some kind of merit. In the cuneiform inscriptions of Sennacherib,

* *Medresse*, "College."

published in the "Records of the Past," vol. vi., New Series, edited by Professor Sayce, after describing the taking down of an old palace, there occurs the following passage:—"In a favourable month on an auspicious day I built on this foundation according to the wisdom of my heart a palace of *pilu* stone and cedar wood, in the style [?] of the Hittites, and a great palace in the Assyrian style [?] which far exceeded the former in adaptation, size, and artistic excellence, through the work of the wise builders of my royal rule." Whatever may have been the character of the Hittite architecture, the words of the inscription appear to imply that it had some features that were different from the style practised in Assyria.

NOTES.

THE Durham County Council sat on the 7th in consideration of the question of the County Buildings competition. Of course no one who knows much of the ways and workings of corporate bodies in these matters would seriously have expected that they would have re-considered their decision. The Council dwelt much upon the fact that they were acting within their legal powers; having arranged those legal powers, in the terms of the competition, so that they could leave themselves full liberty to throw over everybody and every thing. It appears, however, as if the assessor, Mr. Vickers-Edwards, had not made things as clear as he might have done. The following letter from him to Messrs. Tree and Price was read:—

"County Surveyor's Offices, Wakefield,
November 1, 1895.

DEAR SIRS,—I have received the copy of the protest *re* the Durham New County Offices, and carefully perused the same. That the design marked 'Onward' was far and away the best scheme I think it will be difficult to contend against. and it won purely on merit. The design marked 'Demos,' which I understand the Council wish to carry out, should, I think, have been disqualified, not having complied with the instructions and regulations issued to competing architects. Of course the Council is not bound by my award, but it is the usual practice to abide by an assessor's advice or prove the same incompetent and bad. Such course has not been adopted; and I consider that Messrs. Cooksey and Cox have not received that fair play and justice which Englishmen are entitled to.—Yours faithfully,

J. VICKERS EDWARDS.

Messrs. Tree and Price."

The Durham Council assert that the assessor did not point out to them the reasons why the plans selected should have been disqualified, and on this point we have as yet no explanation. The protests of the Institute of Architects and of the Northern Architectural Association were characterised as "inimical to the interests both of the ratepayers and the profession," and the chivalrous protest of the other competitors was characterised by Lord Ravensworth, a member of the Council, as "a professional squabble." The conclusion we have long ago come to is that the competition has been a mere pretence from the first, and that the result of it was prearranged, and it appears to us to be one of the most discreditable things that has ever taken place in connexion with an architectural competition organised by a public body. In fact, although we have always maintained that the assessor in a competition should be rather an adviser than a judge, the result of this one almost inclines us to think that, unless in a limited competition and where the competitors have very good reason to believe in the good faith of the committee, it is not safe for architects to expend their labour on competitions except on the condition that the assessor's award should be binding.

THE London County Council having passed a motion practically dictating to the Government the terms in which a Bill for the establishment of a Water Authority is to be introduced, have now followed up this move by a resolution to the effect that the City and County of London are to be united. These motions are mere waste-paper; there is no public feeling in favour of such a proposal; on the contrary, the last election showed that popular opinion was against such proposed change. The question at present is too academic for serious discussion. London desires to see the water question settled and various improvements carried out before it begins to think of amalgamating the Corporation of London with the County Council.

THE School Board for London have issued their annual schedule of the sites which they propose to acquire for either new schools or the enlargement of their existing premises in order to meet the constantly-increasing demand in that behalf. The aggregate number of sites thus fixed upon is seventy-three. These are distributed in the official Divisions of Chelsea (2)—at Hammersmith and Kensington, Finsbury (8)—at Islington and Stoke Newington, Greenwich (11), Hackney (8)—at Hackney, Shoreditch, and Bethnal Green, East Lambeth (13), West Lambeth (12), Marylebone (1), Southwark (7), and the Tower Hamlets (11). We notice that the requirements for additional school accommodation are largest in the east and south of London: at Mile End Old Town, Poplar, St. George's-in-the East, Limehouse, Stratford, and Bromley; and, south of the Thames, at Greenwich, Charlton, Lewisham, Plumstead, Penge, Camberwell, Deptford, Newington, the Borough, Lambeth, Clapham, Battersea, Streatham, Wandsworth, Rotherhithe, and Bermondsey. As regards the several divisional areas, the highest total is that scheduled for West Lambeth, being about 550,115 square feet; next in point of extent rank Greenwich and East Lambeth, about 471,075 square feet and 201,172 square feet respectively; then comes the Tower Hamlets Division with about 197,617 square feet. In our figures we have made allowance—by striking the mean—for each case (there are five in all) of "alternative sites," so that, following such computation, we find that the total of areas to be taken amounts to about 1,879,956 square feet, or a little over 43 acres, for sixty-seven sites. One of the sites is unusually large, namely, that in Lavender Sweep, near Clapham Common and the Junction; it comprises a plot of land in Limburg-road, together with Lavender Lodge, its gardens, and stabling; about 135,870 feet superficial.

THE report of the Examinations Department of the City and Guilds of London Institute for the Session 1894-5 states that there is a marked increase in the number of candidates in plasterers' work, the numbers at three successive examinations having stood at six, twenty-three, and thirty; and the Examiner is now hopeful of some real improvement being effected in this trade, by the aid of the instruction given in the technical classes, and the stimulus to better work afforded by the prizes offered by the Plasterers' Company. In plumbers' work the number of candidates has for some time been very large, and is still increasing; 1,333 came up this year, as against 1,253 the previous year. In mechanical engineering there has been a falling off in the number of late years, which still continues, but this is considered to be due to the greater difficulty of the examination, and it is apparent that a higher class of artisans are presenting themselves for it than formerly. The attempt to supplement the work of examination by inspection has proved satisfactory, but there is great difficulty in finding competent inspectors on trade subjects. The new programme recently issued contains a syllabus of instruction in painters' and decorators' work, in which subject an examination will be held in 1896.

IN the eighteenth "Hallisches Winckelmanns Programm," Dr. Carl Robert discusses the question of the frescoes of Polygnotus at Athens and specially those in the Stoa Poikile. His work in connexion with the frescoes in the Lesche at Delphi is well known, and it may suffice to say here that the same method is pursued in the present treatise, and that the restoration attempted shows the same wide command of the artistic material available, and especially of Greek vase-paintings. As regards the technique of Polygnotus, Dr. Robert sums up his results as follows:—The pictures used for the decoration of walls by Polygnotus are of about 5 mètres in height and of very varying width, the figures are approximately life-size. They are sometimes painted on stucco, sometimes on separate wooden panels fastened to the wall. The ground is white, the figures are painted in flat tints without shading; the ground is not treated as a background, the only indication of any such idea are curved lines, which denote that the whole scene was a hill country. The figures are disposed evenly over this ground, and some of them are intercepted midway by the curved lines. As to colours, black, white, red, and yellow of various shades are the main colours; green and a particular sort of blue are occasionally intermingled. Dr. Robert confesses in his concluding words his conviction that the smallest fragment of the actual paintings may at any time do more for the understanding of the art of Polygnotus than volumes of speculations, and he shares with all archæologists the hope that at any moment the French excavations at Delphi may be crowned by the discovery of some portion of the decorations of the Lesche. On the Acropolis have been found fragments of frescoes of the same date in excellent preservation, so the hope is not unreasonable.

THE correspondence in the *Standard* upon the taking of chills in churches reveals some amusing differences of opinion as to the causes of such illnesses. But experience has shown that however good may be the warming and ventilation of these edifices quite a small amount of carelessness on the part of those in charge of them will have uncomfortable consequences for a congregation. If, for example, the place is overheated when the weather is very cold, a frequent mistake, the extreme change of temperature will often produce very injurious effects on some members of a congregation. An architect can no more prevent such mishaps than can the builder of a steamship prevent those in charge of her from going too fast in a fog. There is no doubt also that inefficient heating and ventilation frequently arise from an undue parsimony when a church is built or repaired, and architects ought strenuously to insist on the best means being used. The physical tendency to take cold is probably, on the whole, greater in churches than in any other places; the robuster frequenters come in warm after exercise and liable to take cold. Many delicate persons, on the other hand, sit for considerable periods in churches who are quite unfit to remain stationary except in their own houses. Architects have, in fact, to protect congregations from their own rashness.

ANOTHER of the constant complaints about bad water-supply in country districts comes up in Dr. W. W. E. Fletcher's report to the Local Government Board on the sanitary circumstances of the Thurmaston Urban District. It appears that so far back as 1878 the water-supply of a portion of Thurmaston was pronounced by Mr. Dalley, the then Medical Officer of Health, to be bad, but hitherto it has been found impossible to move the late Local Board, or the present Urban District Council, to provide a proper water-supply for the place, although such a supply could be obtained, without difficulty, from the water-mains of the Corporation of Leicester. The actual supply is derived from numerous surface-wells usually sunk in back-yards or gardens, said to be dry-steined with bricks. From such indefinite answers as

could be obtained it would appear that few of them exceed 20 ft. in depth. The water is clear, and is usually well spoken of by the inhabitants, but what its hidden qualities are likely to be may be judged from the details as to some of the sites of these wells. One is beneath a fowl-run, ten yards from two privies, less than six yards from a catch-pit for drainage of a piggery; another 12 ft. from a churchyard (closed on account of being overfull), and on a lower level; another five yards from a shallow hole for ashes and other refuse, about the same distance from a disused piggery, and about eight yards from a privy cesspit. We get the same kind of story from High Wycombe, where Dr. Wheaton reports that the water-supply is partly from shallow wells which are most commonly situated in back kitchens of houses, or in yards, and nearly always in proximity to sources of possible contamination of the water afforded by them. The loose gravelly soil in which they are sunk, and the fact that they are only dry-steined, and without external puddling of clay or cementing of the brickwork lining them, favour the percolation into them of matters from the surrounding soil. They are not cleaned out, except when illness arises or the water becomes evidently foul. The most common source of possible contamination of the water in these wells arises from their proximity to closets, the well being frequently situated close to the closet, and the soil-pipe or the house-drain passing by the side of the well, or even over the top of it.

IT seems likely that the Hull Corporation will follow the example set by Bradford and St. Pancras, and will double the pressure of their electric supply. They are only waiting to consult with the Board of Trade, who may insist on certain alterations being made in existing fuse-boxes and switches. There are now plenty of 220-volt lamps in the market, and their efficiency seems quite as high as that of the ordinary 110-volt lamp. One serious question to be considered by companies wishing to supply at a higher pressure is the cost of supplying all their clients with lamps. It is obvious that it would not be fair to put their clients to the expense of installing new lamps, their old ones being useless at the higher pressure, simply to suit the convenience of the company. Hence the only equitable arrangement seems to be that the company supply the new lamps. To a large company this would involve very considerable expense. Mr. A. H. Gibbings, lately Engineer to the Hull Corporation, has calculated that, allowing for the sale of the old lamps, the net cost of the change over will be about 1,500*l*. As there are some 15,000 lamps concerned, this estimate seems to us to be too moderate.

WE all know pretty well by this time what to expect when we go to an exhibition of Mr. Herbert Marshall's drawings, a collection of which is now on view at the Fine Art Society's Gallery—"London; its streets and river." Mr. Marshall is in fact the artist of London, and his water-colours have done more than anything else to show people how much real picturesqueness there is in our capital, in spite of its bad reputation for outward attractiveness. Mr. Marshall is dependent, no doubt, as London effects are, a good deal on the state of the atmosphere, and he makes the most of mists and sunset colouring; but still his scenes are generally faithful to the originals, and their locality easily recognisable. From the purely artistic point of view some of the smaller drawings of the present collection are the best; "Whitehall, looking south" (4), with the Houses of Parliament towers in misty outline above the houses; "Millbank Wharf" (10); "Cannon-street" (12), a fine thing in colour, but the silhouette of St. Paul's is not entirely in proportion; "The Abbey and Millbank" (22); "The Pool Frost-bound" (24); "Ludgate Hill from the Cathedral Steps" (27), a capital little composition; "Kensington Gardens" (29), with the Palace in the background; "Chelsea Twilight" (33), the twilight effect very beautifully and truthfully given. "The Pavilion at Lord's" (61), is a peculiarly bright sketch, and "Southwark Foreshore" (63) a powerful little study of colour in things dilapidated. In his large drawing of "Trafalgar Square" (23), Mr. Marshall has departed from his usual topographical accuracy by bringing St. Martin's part way down the hill to make it a dominant central object in the composition, instead of showing it as it is, nearly in line with the National Gallery; this is not quite a fair way of making a picture; the smaller version of the scene (69) is more correct.

THE special principles of the New English Art Club seem to become more and more difficult to define. Some of the best works in the Dudley Gallery have no common ground with those which are supposed to represent the special "new-ness" and "Art-Clubness" of the exhibition. Mr. Moffat Lindner's "Toledo" and "Pasajés" (12 and 26) are simply admirable specimens of rapid colour-sketching, such as any able artist might execute as a record of effect when there was no time to put in details. Miss Malcolm's "Portrait of Miss Elsie Young" (10), one of the largest works, is pretty and graceful, but rather suggests the art of the last generation than of the coming one. Mr. Mark Fisher's admirable little "Moonlight" (49) is masterly, but Mr. Fisher had made his own reputation long before the English Art Club was started. Mr. Furse in his portrait of the Hon. and Rev. Lyttelton (63), and Mr. G. Thompson in that of Mr. R. O. Sickert (51), in which the hands are particularly well painted, may be said to have toned themselves down (or up) to the level of ordinary artistic style; while Mr. Wilson Steer in his portrait (60) still seems to think it effective to take one of the most offensive looking sitters he can get, and exaggerate the offensiveness, and Mr. W. Sickert can still exhibit, in "The Boy I Love is up in the Gallery" (73), his diseased sympathy for music-hall ugliness and vulgarity. Among the better works of those which may be said to represent the special tendencies of the Art Club, Mr. Bernard Sickert's "Dover" (45) is a fine broad study of effect; Mr. Mallet's "March Morning" (64) really suggests what the title conveys; Mr. F. Bate's "Over the Whispering Wheat" (83) is a beautiful and refined rendering of a very delicate effect in landscape; and Mr. James L. Henry's "Deal Pier at Night" (87) is noticeable as a moonlight study which looks like moonlight, and does not put in too much detail, as many painters of moonlight are prone to do.

AN AMERICAN ARCHITECT ON RENAISSANCE ARCHITECTURE.

THE following passage forms the conclusion of the fourth of the series of articles by Mr. R. S. Peabody on "An Architect's Vacation," which are appearing in the pages of the *Atlantic Monthly*. This article is in the current number of that magazine, and was referred to briefly under the head of "Magazines and Reviews" in our last issue. While we are being told that the architecture of architects, developed at the Renaissance, is no true architecture and gives no one any pleasure, it may be rather to the point to notice how it affects the mind of an eminent American architect, revisiting it after many years. Mr. Peabody says:—

"As the Renaissance was in its origin a modern movement, so it has remained the foundation for modern art. It quickly established a type for modern palatial architecture in the frowning strength of the Florentine palaces and the dignity and elegance of those of Rome, while the later palaces of Venice, if somewhat vulgar in detail, are still grand and modern types.

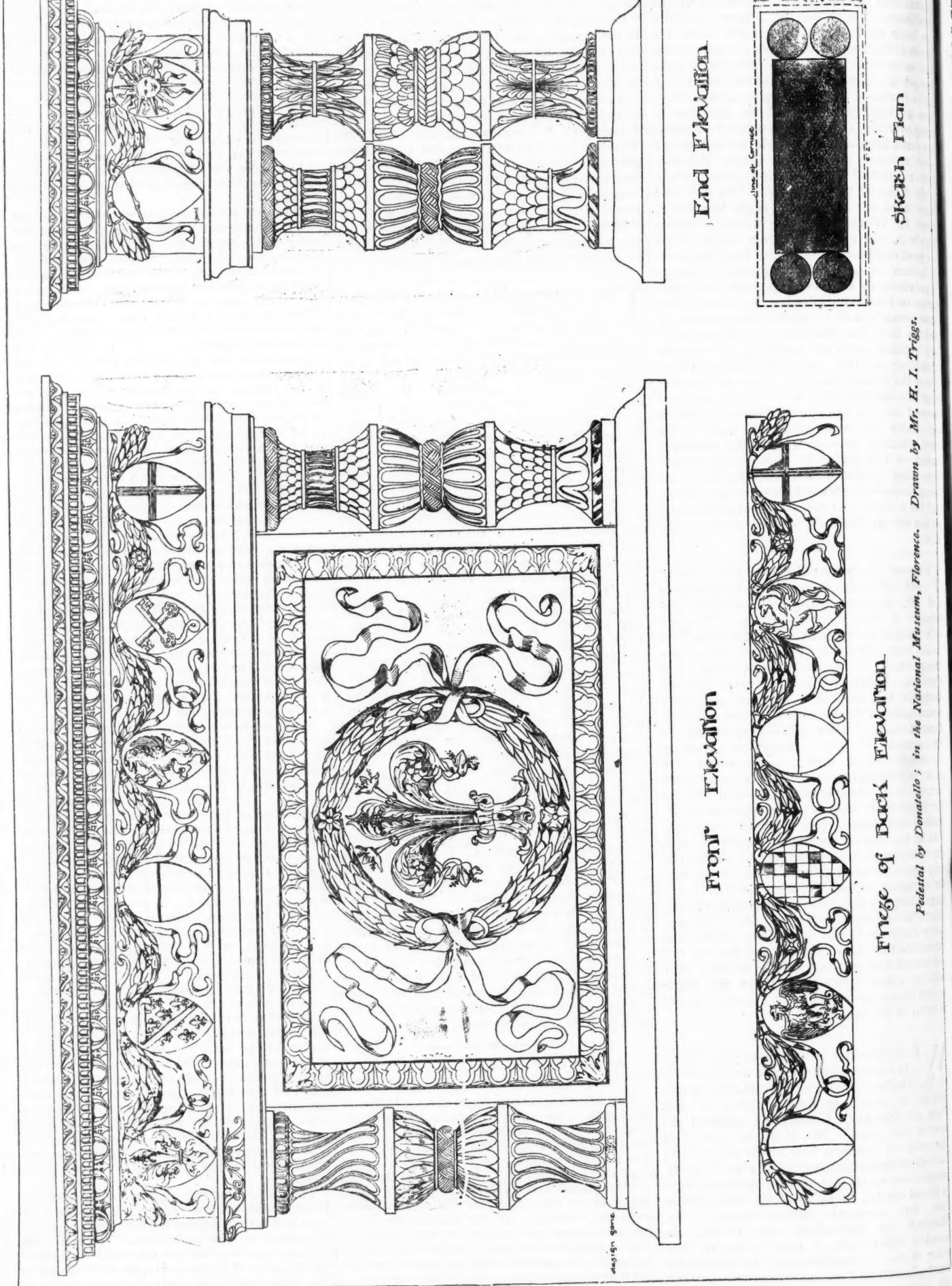
In church architecture, however, the Early Renaissance never reached a final or consummate result. At the very outset Brunelleschi gave an elegant Classic dress to the ancient Gothic forms, but the most enthusiastic could scarcely claim that he surpassed the Mediæval solution of the same problem. Perhaps he intended that colour should adorn those rather chilly interiors; and, set off by gold and fresco, their elegant detail would have given richer results. During the entire Renaissance period the favourite scheme for a church was a domed building with short projecting arms. Around Milan are many dainty examples of this idea, worked out under the influence of Bramante. Indeed, such was Bramante's design for St. Peter's; but one architect after another changed and marred it, and we now can only guess what might have been the perfected result of Renaissance church building.

Our party are all familiar with Rome, but we pass one wonderful Easter Day there; and as we traverse its streets, the whole history of the Renaissance architecture we have been studying is passed in review. Here stand before us not alone the highest results of that art, which, as we have seen, came to Rome from Florence and Milan, but also the ancient classic models which had inspired both Florentine and Milanese. It is a wonderful experience! . . . In crossing the city, our road lies by the great temples and the forums. Accustomed as we are to line-engravings of the orders, and to hearing ancient Roman architecture described as mechanical and inartistic by writers like Mr. Fergusson, it is invigorating to get a fresh look at the real thing. Where will one find a richer, fatter, better carved, or more handsome decoration of any period than that on the remains of such a building as the Temple of Concord? The freedom and juiciness of the Early Renaissance work go back to classic days, and one appreciates in Rome that it is often hard to distinguish between carvings of the two periods.

But our drive extends beyond the Forum, and at last we enter the mighty Coliseum. How humble and minute we feel before the tremendous mass of that immense structure! How small and insignificant seems the work that keeps us awake o' nights! One irreverent thought alone upholds us. It is a comfort to see that the giants who built it were unable to roof it. A paltry patch of velarium to keep the sun from the emperor's eyes, and which must have been a sad trouble in a gale, was the nearest they could come to our spider-web, wide-spanned roofs.

When we have recovered our breath a little, we continue back by the Forum and the temples and the palaces of the Cæsars to the neighbourhood of the Renaissance palaces, and pay homage to Bramante at the Cancelleria and the Giraud, to Peruzzi at the Massimi, and to Sangallo and Michelangelo at the overpowering Palazzo Farnese. The sun shines brightly as we reach the glorious piazza before St. Peter's Church. The fountains on each side of the great obelisk flash gaily, and men are ringing Easter peals with tremendous clangour on the tower bells as we join the crowds moving up to the doors. It simply intoxicates us all. We have been living in Florence with such austere companions as Brunelleschi and Alberti and Sangallo, with a little merrymaking amid the picturesqueness of Siena and San Gemignano, and as we pass through St. Peter's door, and the beauty of those gold-and-white ceilings bursts upon us—the church filled with crowds, the piers decked with red hangings, a great choir singing the service, and a Cardinal at the lighted altar—well, the heart beats fast, and the breath catches with a queer gasp. Mr. Fergusson says that the great pilasters are unmeaning, offensive, useless, and that the window details are in the most obtrusive and worst taste. Doubtless these or other flagrant defects are there, but our little party are satisfied to sit down in a row on the base-mouldings of those very pilasters, and feel humble and modest and small, and thankful for such a day.

The modern painter may be carried away by Parisian *technique* and passing fads, but for most great and lasting qualities the Renaissance masters still remain to him *the* Masters. The cleverness of modern writers has not yet made the study of the English of Shakespeare, of Milton, and of the Bible useless to one who would arrive at excellence in literary style. The modern architect, for the same reasons, studies the works of those who were not only the masters of modern architecture, but its very inventors. Our pilgrimage among their buildings is a memory, but we shall not forget the daintiness of the Roman villas or the grace and ornate beauty of the Roman palaces. We have learned respect for the giants who built the Church of St. Peter and the Palazzo Farnese; and we have seen, too, with our own eyes, how closely they were the descendants and the rightful heirs of those earlier giants



Pedestal by Donatello; in the National Museum, Florence. Drawn by Mr. H. I. Triggs.

who covered the Campius Martius with temple and portico and circus, and adorned the Palatine with palaces; who built the forums and vaulted the baths, and domed the Pantheon; and who raised on its mighty arches the stupendous mass of the Flavian amphitheatre."

PEDESTAL BY DONATELLO.

THE "Pedestal of the Lion," so called from the figure of a lion (the emblem of the Florentine Republic) which was placed on the pedestal, is a work of Donatello's; the original is now in the National Museum at Florence; there is a copy at the northern angle of the steps of the Palazzo Vecchio, overlooking the Piazza della Signoria. The arms around the pedestal are those of the various quarters or districts of Florence.

The drawing, by Mr. H. I. Triggs, is from the cast in the South Kensington Museum, and was one of the set of drawings for which its author received the Architectural Association Travelling Studentship this year.

NOTES FROM GERMANY.

THERE has been a great increase of theatre building in Germany lately, though this kind of building enterprise is much hampered by the stringent police regulations as to planning and construction which are enforced both in the provinces and in Berlin. In October a theatre was opened at Bromberg, and another is being carried out at Rostock. Both buildings are from designs of Herr Heinrich Seeling, and are excellent in plan. A model German playhouse is to be erected at Eisenach, where classical drama will be pro-

duced on the same lines as at the Wagner Theatre at Bayreuth. The capital for this enterprise is 40,000*l.*, most of which will be voluntarily subscribed. The seats (1,200) are arranged as at Bayreuth, and priced at one figure throughout the hall. Special attention will be given to the stage machinery. Two new theatres are in course of erection at Berlin, both situated in the "west," or fashionable part of the city, and a large temporary theatre is also being erected in connexion with the Industrial Exhibition. Herr Sehring is the architect of the Exhibition Theatre. He also acts as proprietor, architect, and contractor of one of the former buildings. Of other theatres lately completed, the most important is the Court Theatre at Wiesbaden, of which Messrs. Fellner & Helmer are the architects. A number of theatres have also lately been altered, including the Court Opera House at Berlin, which was closed for some time, and has lately been reopened. The old Court Theatre at Hanover is also in the hands of the builder, and the Munich Court Opera House will soon be closed for alterations. All these buildings, it should be remembered, are monumental structures of considerable architectural pretensions.

At Berlin, the new extension of the General Post Office is now practically completed. As is generally the case with the post-offices in Germany, great pains have been taken to make the block architecturally important, and a model of modern construction. The extension, which is on a prominent corner site in the Leipsic-street, covers a superficial area of some 5,500 square mètres, and has accommodation for the secretary's office, the book-keeper's department, a number of committee rooms and the post-office museum, together with a number of official tenements, inciuding the residence of the Postmaster-General. The post-office museum has its entrance at the corner, and the galleries are well marked on façades by their spacious windows. In plan, the museum consists of a covered court for the larger exhibits, round which the galleries are grouped on two floors and receive a good side light. The Postmaster-General personally attended to the planning of the building, which can only be termed excellent; and Herr Hake, the chief of the Post Office Works Office, was entrusted with the design of the façades, the interior decoration, and the supervision of the work. It is of interest, perhaps, to here add that the German postal service now has 26,000 post-offices and 13,000 telegraph offices, as compared with 4,000 and 1,000 respectively in 1871. The annual number of letters dealt with by the service is 2,984 millions, as compared with 734 millions; and the number of telegrams 31 millions, as compared with seven millions.

The memorial church to the deceased Emperor Frederick, which was recently consecrated with much ceremony at Berlin, in the presence of Emperor William and the Dowager Empress Frederick, is situated in the "Thiergarten" or Royal Park. The site was presented to the parish authorities by the Emperor, and the building has cost 26,000*l.*, of which nearly half was raised by public subscription, and the balance voted from the parish funds. The foundation-stone was laid in October, 1893, so that the work has been just three years in the builder's hands. Herr Vollmer, of the Royal Technical College, was the architect, and has adopted an Early Gothic brick style, better known in this country as "Pomeranian." The plan is a simple cross, and allows for a special royal pew, directly opposite the pulpit. Special care has been given to some excellent mosaic work, and the joinery of the pews and doors, and a considerable sum has been spent on wrought-iron work. Whilst by no means as imposing a structure as the Emperor William Memorial Church, to which we referred in a previous number, the memorial to Emperor Frederick is certainly more in keeping with the wishes of the deceased than the former place of worship. The pretentious monuments which are being constantly built in memory of Emperor William and Emperor Frederick are exactly contrary to the wishes of the deceased monarchs, who always preferred economical but refined architecture, and would have thoroughly disliked the tawdry and coarse ostentation shown in some of the German memorials of to-day.

The new buildings in the Royal Technical College at Darmstadt, which were opened the week before last, have cost 2,063,000 marks, or about 100,000*l.* They consist of a main building, a special block for the natural science and electro-technical laboratories, and a central station for illumination and heating purposes. Professor Wagner and Professor Marx were the joint architects, whose plans were, however, governed by the wishes of a special technical commission, presided over by Professor von Weltzien. The main block shows in plan the letter E, the two end wings having a length of 72 mètres and 42 mètres respectively, and the principal frontage being 92 mètres, or 300 ft. The situation of the main building is most satisfactory, and its aspect very suitable for the numerous *ateliers* for which room had to be found. Besides these *ateliers*, there are a number of lecture-halls and class-rooms in the block, and a very large library has been provided. The architectural rendering of the buildings is by no means as pretentious as the modern colleges at Berlin and other German cities, but the arrangements throughout, including the heating, ventilation, &c., are exceedingly practical. The amounts show that, of the 100,000*l.*, about 50,000*l.* were spent on the main building, and as the contents are about 62,000 cubic mètres, this only means a price of about 15s. per cubic mètre. We must congratulate the architects on successful planning and great economy.

THE ARCHITECTURAL ASSOCIATION: POMPEII.

THE second ordinary meeting of the Session of this Association was held on the 8th inst., in the Meeting-room of the Royal Institute of British Architects, Mr. W. D. Caröe, M.A., F.S.A. (President) in the chair.

The following new members were elected, viz.:—Messrs. H. Creswell, F. W. Platt, A. Paull, A. S. Flower, M.A., L. G. Bird, G. C. Carter, P. M. Dawson, C. R. Dibdin, T. T. G. Donaldson-Selby, R. C. Hall, J. C. Hawes, C. Imossi, R. J. W. Newman, W. C. Oman, S. B. Pritlove, F. N. Reckitt, C. E. Varndell, H. A. Veale, W. S. Weatherley, H. White, W. H. Romaine-Walker, J. Armitage, jun., J. Bevir, H. W. Ford, J. E. Franck, H. L. Goldsmith, C. E. W. Hope, L. C. Gregory, S. H. Hamp, C. H. Isaacs, W. G. Largen, A. C. Little, W. G. Milburn, R. L. Miller, F. G. Newton, B. S. Rodd, E. Rowlandson, H. C. Scotto, W. P. Steel, F. C. Wheeler, and L. K. Hall.

Several gifts were announced to the library, and votes of thanks were accorded to the donors.

On the motion of Mr. B. F. Fletcher (Hon. Secretary), votes of thanks were passed to the gentlemen who had assisted in connexion with the late conversazione, to the different firms who sent exhibits, to the Rebec Orchestral Society, and also to Mr. G. B. Carvill and the members of the Entertainment Sub-Committee, for the excellent way in which they had carried out the arrangements.

The President said that the committee were exceedingly disappointed with the scant attendance at the modelling class. The modelling class, for reasons which he need not detail, was not one of those which came within the scope of the examinations, nevertheless, he hoped it would receive support. They were more and more led to believe it was very important that handicraft should form part of the training of an architect, and one of the most important handicrafts was that which dealt with sculpture, and was most useful to them in the form of modelling. They had a most admirable instructor and learned sculptor in the person of Mr. Pomeroy, and it would be a matter of great regret if they had to discontinue this class.

Mr. Talfourd Ely, M.A., then delivered the following lecture on "Pompeii," with many excellent lantern illustrations:—

It would be impertinent for an outsider like myself to attempt to speak authoritatively before a professional audience on the great problems of architecture, whether ancient or modern—though I have had the good fortune to sit awhile at the feet of such masters of the craft as Professors Hayter Lewis and Roger Smith. As, however, this Association has done me the honour to invite me to read a paper on Pompeii, I will endeavour to place before you, clearly and briefly, the main results of recent scientific exploration on that interesting and fruitful site, and while lightly touching on matters of importance in an architectural point of view, will, as far as possible, add an estimate of the state of pictorial art in that city at the time of its overthrow, and especially of the relation of such art to the masterpieces traditionally ascribed to the Hellenistic age.

This may at first sight appear a presumptuous, if not a hopeless undertaking; but under the able guidance of Dr. Helbig much may be learned as to the connexion of the Pompeian paintings with the Alexandrine and the Hellenistic Schools; while the labours of such students as August Mau have rendered it possible to appreciate the development of wall-decoration from the massive splendour of the Ptolemies to the fantastic creations of Imperial times.

On the present occasion, then, after a slight sketch of the obscure history of the city and its inhabitants, I shall proceed to give some account of the buildings as yet brought to light, and shall conclude with a few words on the importance of Pompeii with regard to the history of art.

In the first place, it must be borne in mind that Pompeii was an insignificant country-town—one of a hundred little centres of life and trade once dotting the rich surface of sunny Campania.

The oblivion that has obscured so many of her quondam rivals might well have extended to Pompeii herself had her fall been left to the ordinary agencies of time and the barbarian invader.

But, paradoxically enough, Pompeii has been preserved by destruction; and the swift annihilation that swept her from the Roman world has enabled us of the nineteenth century to behold her face to face, presenting to us a strange and vivid picture of the life that was lived in Southern Italy well-nigh two thousand years ago.

Pompeii has been called the Brighton of antiquity; Herne Bay or Clacton-on-Sea might have been nearer the mark. Yet the stately fanes of Athens, the mighty arches of Imperial Rome can never mirror to us the every-day life of an ancient community as does this petty municipality with the sorry stock-in-trade of her little shops, and the *graffiti* on her walls, apparently fresh scribbled by a passing hand.

Pompeii stood—where it no longer stands—at the mouth of the Sarnus, on the shore of the Bay of Naples, a bay known as the Crater,* or Wine Bowl, not probably without reference to the rich vine lands that surround it. The foundation of the city is lost in antiquity, and its name seldom occurs on the historian's page, though the trade of Nola and the surrounding district must have enriched the little port.

According to Strabo† it passed from the Oscans to the Etruscans and the Pelasgians, and from them to the Sammites, before it was absorbed in the ever-growing Empire of Rome. That it once contained a considerable Hellenic population may be guessed from the remains of its Grecian temple,‡ but it was not a Greek colony as its neighbour Neapolis was.

In the Social War Pompeii took an active part, and was besieged by the great Sulla himself. Eventually the citizens obtained the Roman franchise, but a part of their lands was transferred to the colony of veterans planted by Sulla under the name of *Colonia Veneria Cornelia Pompeianorum*.

After this Pompeii became a favourite resort of the Roman nobility, thus Cicero had his *Pompeianum* or villa there, and so had the Emperor Claudius.§

In A.D. 63 the city suffered great damage from an earthquake,‖ from which it had not recovered when, in A.D. 79, it was overwhelmed, together with Herculaneum, by an eruption of Vesuvius, an eruption described by the younger Pliny,¶ though without special mention of the towns in question.

The rare occurrence of the precious metals in the *débris* leads us to believe that the ruins were searched shortly after the catastrophe. On the other hand, the diversion of the river's course and the extension of the shore between the sea and the walls, long hindered the identification of the site in modern times.

In 1748, however, the city was discovered; and in 1755 excavation began, in a somewhat haphazard fashion, for scientific exploration dates only from our own day.

The plan of the city is roughly an oval, with a circumference of about two miles. The walls, strengthened with rampart and towers, still gird every side except that towards the sea. As to these towers and the masons' marks on the stones, the student should consult Mr. Fitz Gerald Marriott's recent work, "Facts about Pompei," which will be found teeming with interesting

* Strabo, 247. † *Ibid.*

‡ On this building F. von Duhn and L. Jacobi have published a monograph, "Das griechische Tempel in Pompeji" (Heidelberg, 1890). The object of their excavations was to settle the plan of the temple. They found the cella to be not quite in the centre. The nature of the material (tufa) seems to have precluded exact measurement. The columns were placed six at each end and eleven on the flank—an arrangement said to be known elsewhere only in the Metroon at Olympia. They have the rare number of eighteen flutings (pp. 7 and 8). See also Overbeck and Mau, "Pompeji," p. 87. For further researches see Sogliano, in the "Monumenti" of the Accademia de' Lincei, 1890, pp. 190-200.

§ Suetonius, "Claudius," xxvii.

‖ Tacitus, "Annals," xv. 22.

¶ "Epp.," vi., 16 and 20.

results of personal investigation. From this we learn that "the towers are not all built on the same plan." They are not actually square, "their greatest length lying at right angles to the wall from which they project at both ends."* "Apparently a smaller turret may have existed on the city side of the tower on its roof, covering the top of the stairway that led up to the latter."

It is curious to hear that "no attempt has been made to excavate either" these towers "or the walls, which date from long before the Roman occupation, though the towers date from the time that the walls were restrengthened and patched with *opus incertum*."†

So Mazois ‡ says:—"La construction de ces tours indique qu'elles datent du même temps que les réparations faites aux murailles."

It is especially on the materials of these walls that Mr. Marriott has found marks "cut into the stone about half an inch to an inch." They "are 5 in. to 9 in. in height; many of them are like Greek characters." Such marks are found "also on the large stones used for edging the side-walks, as well as on the paving itself, of certain streets."

As a rule the streets are straight, and at right-angles to each other. A notable exception is the chief street, leading to the Forum from the north, which is very crooked, and only 14 ft. wide, including the footpaths. Other streets are wider, but none exceed 30 ft. Vehicles, of course, seldom traversed them. The pavement is of lava.

In succession to the streets of the living—if such a term may be used of a buried city—we may glance at the streets of the dead. At Pompeii, as elsewhere in the ancient world, the roads leading from the gates to the country were lined with tombs. One especially, the road leading to Herculaneum, is most noteworthy, the monuments being still in good condition, though the stucco-reliefs on some have perished.

The public buildings already brought to light include the Forum, an amphitheatre, two theatres, arches, three sets of baths, a basilica, the edifice of Eumachia, and several temples, though not all that are mentioned in inscriptions. Nearly the whole of these had been overthrown, or at least damaged by the earthquake, and their restoration was not completed when the eruption of Vesuvius took place.

The Forum was paved with a white limestone, brilliant as marble, surrounded on three sides by a Doric portico, and adorned with statues, the marble pedestals of which still remain.

The names of most of the buildings in the neighbourhood of the Forum are very doubtful. Thus some have denied that the temple of Jupiter is a temple at all; while the large temple assigned to Venus was probably in reality dedicated to Apollo.

The largest of these buildings is the Basilica, 220 ft. in length by 80 ft. in breadth, on the western side of the Forum, with which it is connected by five doorways. Its roof was supported by Ionic columns of brick coated with stucco. Though called a Basilica, it lacks the usual apse. It possesses, however, a raised tribunal. An inscription proves that it was erected before B.C. 78.

One only of the temples is purely Greek in style. Its scanty remnants show that it resembled the great Doric temple of Poseidon at Pæstum, built about 500 B.C.§ The paucity of remains suggests that this Greek temple was not restored after the earthquake.

All other temples yet discovered at Pompeii stand raised on the Roman *podium*.

The flutings of columns are generally filled up with stucco for one-third of their height; and this part is painted with red or yellow ochre ‖

It appears that there was no good building-stone at hand, and marble was scarce.

Tufa seems to have been used throughout the existence of the city.

Limestone was used for private houses of early date, but not exclusively, the upper part of the building being of framework.

The material of the peripteral Greek temple was tufa, with limestone capitals, the difference between these and the tufa shafts being concealed by a thin coating of stucco. In the Basilica both limestone and tufa were employed, and later repairs were executed in brickwork.

It is, however, in her private houses that the unique interest of Pompeii is centred, and I will now turn to them, following for the most part the excellent treatise of Von Rohden in Baumeister's "Denkmäler des klassischen Altertums."

The earliest Italian houses were huts—originally circular, then oval, finally rectangular; with high-pitched roof, from which the water flowed outwards as in our buildings. Such houses are hardly to be found in Pompeii, where the *atrium* is the characteristic type—the *atrium* in which the rain is led inwards, for with neither the *atrium displuviatum* nor the *testudinatum* are we now concerned.

Of the five varieties of *atria* mentioned by Vitruvius, the other three have the roof sloping inwards down to an opening called *compluvium*, from which the water fell into the central *impluvium*. In the *atrium Tuscanicum*, the earliest and commonest form, the roof was supported simply by four cross-beams at right-angles.

More space was gained by the introduction of the *atrium tetrastylum*, in which the roof was supported by four pillars at the corners of the *impluvium*.

In the *atrium Corinthium* the space was still further enlarged by the addition of more pillars.

The *compluvium* admitted light and air, windows being scarce, for glass was not commonly used for such purposes in Pompeii, though frequently found in the later houses of Roman Britain.

The oldest existing Pompeian houses, those of the fourth century B.C., were built of limestone, without mortar, the joints being filled with clay. The "Casa del Chirurgo" is an example. They were in their original state of only one story,* and had no columns.

In the next period the building material was tufa, which better admitted of ornament, as in the case of the columns, which were now introduced under Greek influence. Limestone, however, was still employed for door-posts and to support heavy weights, as the main beams of the roof. The introduction of columns to support the roof encouraged the striving after additional space that seems to have characterised this tufa period, when houses were extended towards the back, colonnades being built round the garden to form the private part of the dwelling.

In the early days of Pompeian excavation less attention was paid to the houses than to their contents. Fiorelli, however, saw that the buildings themselves should be preserved. He put in new woodwork, supported walls, and, in the "Casa del Balcone Pensile," succeeded in rescuing from destruction an actual instance of a *Mœnianum*, or projecting upper story. That upper stories existed throughout the city is proved, indeed, by the constant occurrence of stairs; and Dr. Middleton, in the "Dictionary of Antiquities," goes so far as to assert that "one-storied buildings were practically unknown in Pompeii."† Buildings depicted on some of the walls have attics besides ground and first floors.

Though it is not probable that, in height, the houses of this provincial town rivalled the vast *insulæ* of the capital, with their series of flats rising to 70 ft. or more, yet five-storied houses, placed against the southern cliff of the platform on which Pompeii stands, have lately been excavated; and we may suppose that, as at Rome, the old-fashioned roomy *domus* of the family, with its *atrium* of wide-spreading colonnades, might soon have given way to the lofty block of hired apartments lighted from the street.

As the citizens lived much in the open air, the closed rooms are small, the kitchens especially. Of cellars there are few.

Flooring, except upstairs, was seldom of wood, often some species of mosaic pavement, as the *opus Signinum*, which consisted of small pieces of tile (for which Signia was famous) and stucco well-rammed.‡

Occasionally, the finest examples of mosaic decoration are found in these floors, as the celebrated representation of Alexander and Dareios, undoubtedly copied from a Greek painting of high rank, probably Helena's picture of the battle of Issos.

Far more important are the walls of Pompeian houses, or rather the paintings with which they are decorated; for, apart from their value as reflecting the lost paintings of the Greeks, they enable us to trace with considerable accuracy their own history and that of the buildings in which they are found.

Diverse as are these paintings in subject and execution, there are certain principles common to all.

The walls are covered with stucco, and on this are painted the various pictures and ornaments. The painted wall-surface is horizontally divided into three parts. There are also perpendicular divisions, of which the central one is marked out as the principal field for pictorial display. A certain similarity of decoration is accounted for by the fact that the great majority of the paintings belong to the period subsequent to the earthquake of A.D. 63.

As to the chronological sequence of these paintings, the researches of August Mau have enabled us to distinguish four epochs.

The palace walls of the Ptolemies and other Hellenistic princes were lavishly adorned with blocks of rare and costly marble of various hues. At Pompeii, in the second century B.C. and the beginning of the first, this "Incrustation-style" was imitated more economically in coloured stucco. This style, with its protruding blocks, was not adapted for paintings, so pictorial decoration was confined to mosaics on the floor. Such projecting blocks made rooms actually smaller. In the succeeding "architectural style" they were apparently increased in size, several planes being represented by the help of perspective, and the projecting parts being expressed by shading.

The imitation of an easel-picture on the wall became now the dominant centre to which the painted blocks and the architectural forms of the earlier style simply served as a frame. Thus, from the time of Sulla to the Christian era, the older elements of decoration remained indeed, but were relegated to a subordinate position.

For the succeeding half-century the "Kandelaberstil," as Mau calls it, prevailed, in which slender candelabra form a characteristic means of dividing the main fields of the design.

In this "ornamental" style of the early empire all suggestion of squared stone blocks has disappeared. The plinth no longer appears to project beyond the middle surface, and the strongly-marked cornice above this middle portion of the wall is replaced by a small ornamental band.

Whereas the centre of the wall in the second style was represented as a sort of pillared hall, in the background of which the picture was introduced, now, in this third style, the building is set aside, and the columns with the epistyle form only a *frame*.

The plinth and the main field of the wall surface have their cornices replaced by a narrow band of bright colour, decked out with dainty ornaments.

Above the main field is a frieze, generally black, on which are painted little objects of endless variety.

The third or uppermost division of the wall contains, as a rule, slight ornamental architecture in dull colours. Much naturalistic foliage is employed. As to colour, there are many varieties of tone, *e.g.*, many shades of red.

The plinth and the frieze are generally black—as are often the small panels.

The colours of the upper portions are lighter. The chief characteristics, however, are the white or whitish pillars and candelabra.

But the careful execution and sobriety of tone in this ornamental system did not satisfy the Post-Augustan Age, an age that demanded warmth of colour and startling effect. The wall was now apparently broken through, numberless fantastic and impossible buildings were depicted, through which one looks out into the open air. In these airy buildings are figures. Slender reeds do duty for columns—fanciful oddities—*monstra*, Vitruvius calls them*—crowd the wall—creatures that never existed—nor could exist.

The old painted cornice is now replaced by a plastic one of stucco. Figures are larger than before; and a broad lattice or trellis ornament is a staple characteristic of this fourth and last style, which prevails above all others in Pompeii.

Such are the four epochs of Pompeian wall-painting. As to the technical process of their execution most may be content to follow Donner. For my own part I incline to refer to one of the most trustworthy of our own archæologists, my friend Mr. Cecil Harcourt Smith, whose article "Pictura" in the new edition of the "Dictionary of Antiquities," based on the researches of Blümner,† gives a clear and reasonable account of the methods probably employed.

In the first place, it is certain that the ancients used for their fresco-painting much thicker and

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* "Facts about Pompei," p. 36.

† *Op. cit.*

‡ "Les Ruines de Pompei," i., p. 36, note 3.

§ Von Duhn and Jacobi consider the question of the age of the Pompeian Greek temple an open one (*op. cit.*, p. 14), but suggest that it may belong to the fifth century, or even the fourth (p. 16). They consider that the temple fell in the second century (p. 18).

‖ In the newly-excavated house of A. Vettius this is not the case.

* The upper story of the Casa del Chirurgo belonged to Roman times. Overbeck ("Pompeji," p. 280 of the fourth edition), says, "Das alte Haus hatte ursprünglich nur ein Erdgeschoss."

† *Ibid.*, p. 679.

‡ See Bolton, "Examples of Mosaic Pavings," p. 2.

* Vitruvius, vii., 5.

† "Technologie und Terminologie der Gewerbe und Künste bei Griechen und Römern," iv., pp. 414 fol.

more carefully-prepared layers of mortar than the moderns, and were, therefore, less trammelled by rapid drying.

"The water of the water-colours," writes Mr. Smith, "combining with that already existing in the mortar, releases a part of the hydrate of lime (into which the lime in the mortar has changed by slaking), and pressing through all the layers of colour, after an interval, returns to the surface; here it attracts to itself carbonic acid from the air, changes again into carbonic acid lime, and is deposited over the colours in the form of a thin crystal skin, which is hard to dissolve, and strengthens and protects them in such a way that washing (without friction) causes no injury."

Some colours, however, required a medium such as milk or gum to fix them.

On the difficult question of encaustic painting, much light has recently been thrown by the discovery in Egypt of several mummy portraits executed by this process. That in producing these portraits melted wax was laid on with a brush, has been clearly shown by Prof. Flinders Petrie.*

A further and a far more interesting question remains to be considered, the subjects of the more important pictures and the source of their inspiration. Greek painting, from its perishable nature, has been little more to us than a tradition. With the sister art of sculpture, time has dealt less harshly. If we cannot with certainty say this or that statue is from the hand of Pheidias himself, we may at least point to a brilliant series of plastic works of the highest rank, executed under his immediate supervision, and forming part of the greatest sculptor's harmonious design.

Of Paionios and of Praxiteles we have actual masterpieces. Myron's style is reflected in extant statuary of no mean order; while the marbles of the Mausoleum and of Pergamon worthily represent respectively the plastic art of the fourth century and of a later school.

The great painters of Hellas, on the other hand, are little more to us than the echo of a mighty name. The glories of Polygnotos have perished with the walls they clothed. For Alexander's likeness we are indebted not to Apelles, but to nameless engravers of coins. The arrogance of Xeuxis, the vanity of Parrhasios, are all that is really known of these men, so famous in their day.

As to their successors, however, Timanthes and Nikias, Aëtion, and Theon, and Timomachos, much light has come to us in these latter days from an unsuspected source. The critical acumen and patient labour of the great archæologist Helbig—"*quem honoris caussâ nomino*"—have established the intimate dependence of the best Campanian paintings on the works of artists famous in the Hellenistic age, and the close parallelism of both with the idyllic poetry of that prolific period. The copyists vary, of course, in fidelity to their originals; thus the Medea from Herculaneum, represented as pressing her thumbs together, is probably nearer the original of Timomachos than the Pompeian Medea grasping the sword.

Naturally, there is but a limited number of cases in which such relationship can be definitely asserted. On this subject, however, I may perhaps be allowed to quote what I have written elsewhere.†

"For the various pictures the student should take Helbig for his guide, who has enumerated nearly two thousand in his catalogue, a number now increased by some hundreds. They do not reflect to us the art of periods earlier than Alexander, an art that introduced men only as occasion required, and did not favour *genre* representations. They rather reflect the art of Hellenistic times with its fondness for actual life, children sporting, &c. The art of Pompeii possesses little of the dramatic. It is rather idyllic, and smacks strongly of the Alexandrine poetry. In the whole number of pictures there are only two that can be called historical—the death of Sophonisba, with its portrait of Scipio, and a rough sketch of the fracas in the amphitheatre between the Pompeians and the men of Nuceria.‡ Of the few that can reasonably be traced back to great originals, perhaps the most interesting is the Medea, that may well be descended from the masterpiece of Timomachos. The bulk of the representations are mythological; not dealing with the greater gods, except Apollo, Aphrodite, and Dionysos, but with Eros, Nike, Nereids, the attendants of Dionysos, and some of the heroes, as, notably, Herakles. The rare occurrence of Italian myths is accounted for by the lack of established types to copy. The failure of pictorial power, attested both by Pliny and Petronius,* must, however, refer to conception rather than execution, which was still good, as we see by the wall-paintings, though these can give only an approximate idea of the contemporary easel-painting.† These mythological pictures, with their tendency to the beautiful, together with some general types of mankind and scenes from comedy, which are rather characteristic than beautiful, form one of Helbig's‡ two great divisions—the *ideal*, in which there are many replicas; and the *realistic*, in which there is only one example of each composition. These realistic pictures were less carefully executed than the ideal, and occupied inferior places. The best belong to the amphitheatre, and represent gladiators and wild beasts. Of ideal representations few are derived from epic poetry, which required a larger field, with many figures. Most are quiet or sentimental subjects, akin to those of idyllic poetry, as the 'Lovers with Nest of Erotes.' In landscape we find oftenest a smiling Nature covered with the works of man,§ in which we may sometimes recognise the west coast of Italy, between Ostia and Salerno, and an illustration of Pliny's description of his villas. The important position of landscape in modern art, however, was never reached in antiquity. Ancient art was essentially plastic, and knew little or nothing of atmospheric effects. In delicate grace and lightness of pose the decorative figures hovering on the Pompeian walls have never been surpassed.

For purposes of decoration the wall was divided into separate fields, the centre of each field being formed by a picture bounded by a painted frame. This was an imitation of the separate pictures on panel, and in some cases the picture was actually painted on a separate piece of stucco. In the tent of Ptolemy Philadelphus there were real panel pictures between pilasters. These luxuries were confined to the few, and in the Campanian cities such pictures and pilasters were imitated in wall-painting.‖ Many of these Campanian paintings are of Hellenistic origin. Thus the Herakles with Telephos from Herculaneum, goes back to a work of Pergamene art, and is illustrated not only by coins, but by the smaller frieze from Pergamon, now in Berlin.

Another clue to the great paintings of the fourth century has been found in mosaics. The mosaics of Pompeii are chiefly decorative; one, however, undoubtedly is copied from a Greek painting of a high rank—the mosaic of Alexander and Dareios.¶ The moment chosen is one of intense interest. Alexander, charging the Persian bodyguard, transfixes with his lance the Persian noble who has thrown himself before his king. Dareios stands helplessly in the chariot, which the driver vainly seeks to disentangle from the *mêlée*. In the horse brought up for the king's escape we see the boldest foreshortening; and the face of the Persian reflected in a shield is another instance of technical skill. So excellent a copy implies a great original, and we can hardly be wrong in seeking that original in the famous picture of the battle of Issos, by Helena, daughter of Timon."**

Not to her pictorial treasures alone, however, does Pompeii owe her pre-eminence among the deserted cities of the ancient world. Her bronzes and other ornaments are of the greatest variety and beauty; but it is rather the abundant traces of human activity and traffic seemingly but this moment stopped that raise such vivid emotions in the traveller's breast.

At Delos, richly-decorated houses, dating from the first century B.C., have been brought to light by French explorers. To the historian, according to Prof. Freeman, "Ostia is becoming a fair rival to Pompeii."†† But we are not all historians, and to the ordinary man with ordinary sympathy for his fellow man, the human interest of Pompeii will appeal with the greatest force.

Mr. A. B. Pite, in proposing a vote of thanks to Mr. T. Ely for his great kindness in preparing so interesting a lecture, said they had something more to do than simply to express their thanks; they had also to convey their very great sense of the pleasure with which they had listened to it. They came there on serious thought intent for the purpose of profit, and they had taken their dose of profit that evening in an exceedingly pleasurable manner. They had had an object-lesson from ancient life which had been profitable, and almost with the art of a novelist Mr. Ely had enabled them to live and move in thought in the past. In this nineteenth century they had almost felt it possible to live in that Pompeii which had been revealed to them. It was exceedingly singular, and it came to him with remarkable force, that amid all the advances of civilisation and the developments of science and learning, architects were architects still, exercising their art upon the same materials as of old, just in the same way, he believed, as shoemakers were still shoemakers. They went back into far distant epochs and found their forefathers building in brick and stucco and painting, and that they had really the same problems to deal with as existed in the present day. It was interesting and pleasing to feel that they had a brother who understood something of their daily practice of the arts in a skilful antiquarian who could live himself in the age that had long passed away.

Mr. G. H. Fellowes Prynne, in seconding the resolution, said that they felt grateful to Mr. Talfourd Ely for not having read his paper in a formal way. The manner in which he had delivered the lecture was thoroughly interesting, and caused them to enter into the remarks with very much more zest than had it been delivered formally. It was a common saying that a great man's deeds were more appreciated when he was dead, and certainly they had been having the works, if not the deeds, of the people of Pompeii brought before them in the most vivid way. One could not help feeling some comfort in looking at these pictures and seeing that in so early a period stucco-work was taken advantage of; and that after seventeen centuries it had been excavated, and they were able to actually find the work very much as the workmen had left it. It would be hard indeed, he believed, to go into any modern city, or find a modern town, which could compare in any way in interest with Pompeii—with its theatres, its brilliant shops, its forum, and its temples. Let them think of a suburb of London, and imagine it for a moment destroyed—what would remain of it seventeen centuries hence? One was interested to find the close connexion which Mr. Talfourd Ely drew between the reflection of the art from Greece, in the sacrificial picture, which showed that the connexion was closer than they had generally been led to believe. They must feel in England that the subject was one which really deserved far more interest than they, as architects, had been able to give it, and he hoped that when the members of the Architectural Association went to Italy again they might have a chance of visiting Pompeii.

Mr. FitzGerald Marriott said that Mou was a personal friend of his, and had been the first, amid a good deal of ridicule from outsiders, to distinguish the four styles of decoration. This was not simply guess-work; he had pointed out clearly the gradation between the first, second, third and fourth styles, each with its own period. In the third style there were three varieties, and in the fourth a very large number. In the few ancient cities of Italy which had not been destroyed, there was a probable continuation of these last, which doubtless had developed until modified into what is now seen in our century, viz., a few daubs on each wall. He knew several small inns in Italy with trellis work painted on the walls, which is also one of the last and lowest stages found at Pompeii. Sogliano, the present director, had done an enormous amount of good work in the last few years. Sogliano was for a long time inspector, but with little power, and was, he believed, unknown in England, though he possessed everyone's confidence in Italy. The investigators in Pompeii were only allowed 8,000 francs per annum, and yet the work had been done in a magnificent way, the last house, viz., that of Vetius being the finest house yet partly restored. The roof had only been put on to keep the rain from injuring the fresco. It was full of rich marble, and contained five pictures which had never been seen before in Pompeii. One represented the death of Pentheus, a subject he believed formerly unknown there, while another showed Dirce being tied to the bull, the same subject as the *Toro Farnese*. They would have noticed that one of the views thrown on the screen had shown how the site of the cliff could

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* "Hawara," pp. 18, 19.
† "Manual of Archæology," pp. 218-221.
‡ Cf. Tacitus "Annales," xiv., 17.

* The language of Petronius ("Satiræ," 88) is very strong:—"Cæpi . . . causam desidiæ præsentis excutere, cum pulcherrimæ artes perissent, inter quas *pictura ne minimum quidem sui vestigium reliquisset*."
† Helbig, "Camp. Wandmalerei."
‡ *Ibid.*, p. 68.
§ *Ibid.*, p. 99.
‖ Helbig quotes Plautus, "Menaechmi," i., 2, 34, and "Mercator," ii., 2, 42, 44, to show that the fresco process was established in Italy in the second half of the third century.
¶ See the coloured plate facing p. 612 in Overbeck's "Pompeji" (fourth edition).
** Some refer it to Philoxenos of Eretria.
†† "Studies of Travel—Italy," p. 101.

be utilised for building a high house in tiers. When they came to the top of the cliff they had there the ordinary sized house of Pompeii, and thus the architect had been able to get six to eight stories in tiers, the one behind the other. He did not think that he could add anything further to what Mr. Talfourd Ely had said, but he must thank him, the Chairman, and the whole Association for having so kindly allowed his book to be mentioned, and some of his illustrations thrown upon the screen.

The President said that after the very interesting remarks that had been made he felt that many words from him would be superfluous. At the same time, as they were practical architects, it was well they should consider what bearing every portion of past art had upon the art of the present day, and they might regard the art of Pompeii, which had been so finely preserved, in that light. Mr. Talfourd Ely had specially noted the point that there was a great deal of what he was pleased to term "sham" done at Pompeii. He supposed there was no greater opponent of sham than Ruskin, the purist of the purists, but in discussing the general question of shams he had properly reminded them that in dealing with domestic decoration a more playful and freer treatment of art and of decorative art was allowable than would be the case with public buildings. If Ruskin had gone to Pompeii as his precedent he could not have had a better example, but he believed he went for his precedent to the Renaissance. There was no doubt that they might be playful, and, provided it was done with a certain regard to principle, they might even engage in making sham windows on walls with sham people looking through them. He was bound to say that the art of Pompeii had always struck him as being not very refined, and he was not quite sure that it had not had a somewhat deleterious influence upon what he might call the commoner forms of decoration. The influence might not have come so far as this, although a well-known adaptation of the Pompeiian decoration in a London theatre could not be called altogether successful. One saw this influence very much in Germany and Austria, and to some extent in Italy, although the Italians were so realistic that perhaps they did not think of the past of Pompeii. In Germany, however, the attempt to produce ideas of sham perspective and so forth gathered from Pompeii, were very unsuccessful. There was one little point which Mr. Talfourd Ely might perhaps enlighten them upon. He was struck with two drawings in Mr. Marriott's book which appeared to show labels over the windows. In one case it looked as if the work might have been done in the twelfth or thirteenth century, and it would be very interesting to know if the Pompeiians had adopted the idea of a label over the arch.

The vote of thanks, on being put to the meeting, was very cordially received.

Mr. Talfourd Ely, in replying, said that with regard to the last point he was afraid he could say but little. It was undoubtedly the case in Pompeii that there was a tendency to inscriptions, and one of the most curious was in the case of an inn or tavern, where there was a very vivid representation of what would now be called a "chucker-out." There was a representation of a pair of men beginning to quarrel over their cups, while another man was pushing them and saying "Go and fight outside." There were also many inscriptions of a political nature. Mr. Marriott had referred to one matter he had never thought of, viz., the modern decoration of the Italian inn, which had doubtless descended from the ancient times to which they had been referring. He remembered being much struck with it when he first entered Italy. No doubt it was common and plain enough, but it was an attempt to make the rooms bright and cheerful.

The proceedings then terminated.

ANCIENT CRYPT, WHITEFRIARS.

U[illegible]e west end of Britton's Court, a nar[illegible]*-de-sac* on the west side of Whitefriars-street, Fleet-street, is a very perfect and interesting crypt, probably part of the destroyed monastery of the White Friars or Carmelites. The existence of this crypt or sub-vault has long been known to a few antiquaries, but has recently come into public notice through attention having been called to it. It is entered from the cellar of the house No. 4, on the south side of the court, by an awkwardly-placed hole, close to the cellar floor. The crypt stands east and west, and is about twelve feet square. The walls are well built of clunch masonry; and from them spring, without corbels, seven (but originally eight) free-stone ribs, which converge upon a central boss carved with a large rose. The eighth rib, that from the south-west angle, has been cut away, with much of the angle itself, when the present house was built. The cells of the vault are filled in with blocks of clunch. There are no signs of windows or other openings in the south, east, or north walls, but in the west wall, towards its north end, is a small pointed doorway opening into a passage which curves round towards the north. Further investigations in this direction are probably impracticable through the adjoining property belonging to another owner. Both walls and vault, with the exceptions already noticed, are in a singularly clean and perfect condition, and show no traces of the usual Mediæval whitewash. The floor level is at present covered by an accumulation of earth and rubbish. A good deal of this has, however, been taken out and carefully sifted, with the result that a large number of fragments of pottery and other relics have come to light. The pottery is chiefly modern, but there are pieces of all dates as far back as the early part of the sixteenth century. The relics include such miscellaneous articles as a curiously-shaped pattern iron, a wig-curler, a horseshoe, a modern electro-plated tea-spoon, &c. The construction and architecture of the crypt closely resemble those of the vaulted basements of the Westminster Abbey buildings on the east side of Dean's-yard, and, like them, the crypt is almost certainly of late fourteenth-century date. It would be useless to speculate as to which part of the Whitefriars Monastery it belonged, since the general plan of this is unknown. The crypt clearly owes its existence to its position under the court, where it had escaped being destroyed to make way for buildings. Another crypt of the same character on the north side of the court is said to have been destroyed some eighteen years ago, when the modern premises there were built. There is no present danger of the existing crypt being mutilated or injured in any way.

THE NEW BUILDING OF THE INSTITUTION OF CIVIL ENGINEERS.

THE opening meeting of the Session was held in the new building, as altered and enlarged under the direction of Mr. Chas. Barry, on Tuesday night, though everything except the large meeting-room was in a very unfinished state. The meeting-room is within its old walls, but both floor and ceiling have been raised, and the design altered. The lower order of pilasters has been necessarily removed from the wall, owing to the raising of the floor, and the lower portion treated as a high dado, the upper pilasters remaining. The ceiling is richly treated, with a large cantilever cornice, and a central dome of stained glass; a small semi-dome on each side of it forms a centre for the pendant electric-light globes, another of which hangs from the centre of the glass dome. The floor is at present flat; there is a question whether it should be raised (stepped) from front to back, and we should certainly recommend that this should be done, as it is very seldom that the room is wanted for any other purpose than a lecture-room, and the stepped floor could easily be made removable.

The library, which occupies the front portion on the first floor, with a large range of windows towards Great George-street, will be a very fine room when finished; at present it is only in a shell state. It will afford space for 56,000 volumes, double the number in existence at present, so that plenty of room is allowed for its future extension.

Of the exterior façade we gave an illustration in the *Builder* for June 22 of this year, to which we may refer the reader. A full description of the arrangement of the buildings, materials used, &c., was published along with that illustration, so that it is unnecessary to repeat it here.

INSTITUTION OF CIVIL ENGINEERS.

THE first meeting of the session 1895-96 of this Institution was held on Tuesday, when a portion of the new building, comprising the theatre and approaches, with tea-room, &c., was made available for the purposes of the evening. The chair was taken by Sir Benjamin Baker, K.C.M.G., LL.D., F.R.S., the new President, who delivered his inaugural address.

After some preliminary observations referring to the position of the Institution in the domain of engineering, and the necessity of British engineers acting together in a true spirit of comradeship throughout the world, the President proceeded to discuss the question why engineering, unlike other liberal arts, was an essentially modern profession. Was it because the modern demand for rapid transit, often as purposeless as that of a record-breaking bicyclist, had not its equivalent in the past, or was it because our ancestors lacked the inventive power and mechanical ingenuity of the present age? The artificers who built the highly ornamental barge in which Columbus blundered across the Atlantic could, with the same materials and workmanship, have constructed a clipper ship capable of sailing three hundred miles in a day, but no one asked for speed in those days. On the other hand, although the present was pre-eminently an age of invention, an impartial survey of actions and events recorded in history would satisfy most people that in all ages there were to be found men no less intellectual and enterprising than ourselves. The general answer to the question raised would probably be that as it was only in the present century that people had insisted upon rapid locomotion by land and water, so it was the necessity of meeting that demand which had created the profession of modern engineering. When Watt directed his attention to the steam-engine, the country was weary of wars, and longed for the advancement of its material prosperity, and so a demand was created, and the country quickly became covered with canals, roads, and factories. At that time England depended largely upon her American colonies (now the United States) for the supply of iron, and in 1751 an act was passed admitting American bar-iron duty free to London, but prohibiting its cartage therefrom to Birmingham, as it was desired to make London, instead of Birmingham, the chief seat of the iron manufacture of the country. No one foresaw that Great Britain was to become the leading iron-producing country of the world. On all subjects, indeed, the most eminent men constantly failed in their forecasts. Smeaton did not believe in the steam-engine as proposed by Watt; Telford had grave doubts as to the practicability or usefulness of the Liverpool and Manchester railway; Sir Robert Peel, sixty years ago, blocked a proposal in Parliament to make all the railways seeking access to London adopt a comprehensive plan for a central exchange station, so that through passengers and mails might be saved cabbing across London; Lord Brougham tried, in 1857, to make thirty miles an hour the statutory limit of speed on railways; Lord Palmerston told the House of Commons that the Suez Canal was one of those bubble schemes often set on foot to rob the English capitalist, and even Robert Stephenson, following him, declared it to be, commercially speaking, impracticable. All these mistakes, however, became insignificant when contrasted with the gigantic blunder, acquiesced in by the whole civilised world, of assuming, at the time of the Great Exhibition of 1851, that the efforts of the engineer would effect an immediate change in the long inherent savagery of mankind, thereby inaugurating a period of universal brotherhood and peace. Civil engineers were often reproached for devoting their ingenuity to the devising of man-killing appliances, but with little reason, for no one could fail to see that whatever might be the abstract principles of Christianity, in practical politics they were disregarded, it being always taken for granted that if a nation possessed that which another nation might covet, it must be prepared to defend its possession at the point of the sword. It had been frequently assumed that everyone acknowledged the benefits conferred upon humanity by engineers in facilitating communication, cheapening production and raising the condition of the toiler; but the late Professor Froude had publicly stated that he failed to see much evidence of progress in the nature of men, and that "Even in the outward essentials of food and clothing and housing it is not certain that the mass of mankind in the present generation are better off than their forefathers." The President was not prepared to accept this dictum, and maintained, on the contrary, that the mass of mankind were much better off than their forefathers in these respects. Further, that the independence of the labourer and mechanic had been greatly advanced in consequence of the vastly-increased demand upon their services due to engineering work. In support of this view, it was stated that as recently as four years after the opening of the Liverpool and Manchester Railway, certain Dorsetshire labourers ventured to erect themselves into an elementary form of trade union, and were sentenced to seven years' penal servitude for their pains. At the present time many municipal contracts provided for payment of wages at trade-union rates, whereas a couple of centuries ago the magistrates fixed the rate at Quarter Sessions, according to the price

of food and clothing, the average being about 1s. a day for carpenters and masons, and 8d. for labourers. The hours of labour for all classes were from 5 a.m. till 8 p.m., with 2½ hours interval for meals and rest. The penalty for an employer who departed from these regulations was ten days' imprisonment and 5*l.* fine, and for a workman twenty-one days' imprisonment. No man in search of work could beg without a license, the statutory penalty for a first offence being whipping at a cart's tail; while the second offence meant the loss of an ear and two days' scourging, and the third hanging. On the whole, the study of the past was conclusive as to the material and moral progress which had accompanied the development of engineering works. The President next dwelt upon the work done by physicists in the borderland of engineering, and expressed the opinion that long before the coalfields were exhausted some way would have been discovered of tapping the inconceivably great reservoirs of force in Nature still untouched. Although no one could foresee the demands of the next age, new wants constantly arose, and new branches of engineering often resulted from apparently trivial laboratory experiments. In conclusion, the President sounded a note of warning against the growing disposition to overrate technical education. Education would do much, but it would not endow a man with common-sense, nor would it make his opinion on a multitude of important subjects worth more than that of any naturally observant person. There were not wanting contractors and manufacturers who contended that some of the highly-trained young engineers of the present day were not wholly free from a tendency to over much reliance on formulas, without due regard to the sufficiency of the data upon which such formulas were based. Such faults were best remedied by joining in practical discussions with other engineers, such as it was a province of the Institution of Civil Engineers to encourage.

After the delivery of the address, the President presented to the recipients or their representatives the medals and premiums awarded for papers read last Session or printed in Section II. of the "Minutes of Proceedings."—The meeting was then adjourned till the 19th inst., when it was announced that the following paper would be read:—"The City and South London Railway; with some Remarks upon Subaqueous Tunnelling by Shield and Compressed Air," by Mr. J. H. Greathead.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday, in the County Hall, Spring Gardens, Sir Arthur Arnold, Chairman, presiding.

Victoria Embankment Store-yard.—The Highways Committee recommended:—

"(*a*) That a portion, 10 ft. wide, of the land now used as a store-yard on the Victoria Embankment, be added to the public way. (*b*) That, subject to an estimate being submitted to the Council by the Finance Committee as required by the statute, a wall 8 ft. in height, with entrance-gates at the end nearest the Charing Cross Station of the District Railway, be erected around the land, at a cost not exceeding 680*l.*, and that the land to be added to the public way be paved, and a draw-in to the new entrance to the yard be provided at a further cost not exceeding 200*l.*; that the plans and estimates be referred to the Works Committee, with the view of the work being carried out without the intervention of a contractor; but that in the event of the Works Committee not being satisfied of the sufficiency of the estimate, the Highways Committee be authorised to obtain tenders."

Mr. John Burns, M.P., opposed the recommendation, and said that the Works Committee should follow the example of the City Corporation, and store their vehicles and street sand at their depôt in Lambeth.

Mr. Emden said that if the land was thrown into the public way, a nuisance would certainly be created.

Recommendation *a* having been agreed to, Colonel Ford moved to refer back the second recommendation.

The amendment having been seconded by Mr. Burns and supported by Mr. Beresford Hope, was, on a division, lost by a majority of 31, and the report of the Committee was adopted.

Tramway Purchase.—Mr. N. W. Hubbard, Chairman of the Highways Committee, moved:—

(*a*) That a notice in writing under the seal of the Council be served upon the London Street Tramways Company requiring the company to sell to the London County Council, under the conditions and in the manner provided by Section 43 of the Tramway Act, 1870, the tramways and works and undertaking authorised by the Tramways Orders Confirmation Act, 1874, as altered and amended by the London Street Tramways (Extensions) Acts, 1884, 1885, and 1887, and any other Act or Acts altering and amending so much of the said Act of 1874 as relates to the undertaking of the Company.

(*b*) That the Clerk be instructed to apply to the Board of Trade for its approval of the terms of the foregoing resolution, and to serve the notice therein referred to so soon as the Board of Trade shall have signified its approval,

(*c*) That it be referred to the Finance Committee to take the necessary steps to obtain the insertion in the Council's Money Bill of 1896 of a clause empowering the Council to raise the money required for the purpose of purchasing the said tramways, works, and undertaking."

A long and animated discussion on the subject then followed. Mr. Westacott, a member of the Moderate party, moved the adjournment of the special meeting for a month, so that the legal bearings of the Council's position might be clearly ascertained, but the motion was lost, and Lord Onslow said that after that decision he should not vote for the resolution at all, though when he entered the Council Chamber that afternoon he had determined to do so. Later on in the sitting Mr. Clarke moved that the consideration of the matter should be adjourned for a week, but the motion met with the same fate as its predecessor, after which other members of the Moderate party expressed their intention of not voting for Mr. Hubbard's resolutions. The Chairman put the question, and the majority of the Moderate party left the Council Chamber and passed into the lobbies. The Council then divided, with the following result:—For the motion, 78; against it, 4. The Chairman then explained that, as these numbers, added together, did not represent two-thirds of the Council, the motion could not be carried.

The Unification of London.—The debate was then resumed on the following resolution, moved last week by Mr. Whitmore, M.P.:—

"That Her Majesty's Government be requested to appoint a Commission to inquire and to report what changes should be made in the areas for local administration in the Metropolis, so that the whole County of London shall be divided into districts governed by municipal councils; and that it be an instruction to the Commission in their delimitation of such districts to adhere to existing boundaries and to regard local feeling and historic development so far as may be consistent wtih considerations of administrative convenience."

When the discussion was adjourned on Tuesday week the following amendment, moved by Lord Tweedmouth, was before the Council:—

"That all words after the words 'requested to' be omitted and that the following words be added—"introduce in the coming Session of Parliament a Bill providing, on the general lines of the report of the recent Royal Commission, both for the amalgamation of the City and County of London and for the creation of Local Councils, so that the whole County of London shall be divided into districts governed by Councils whose electoral areas shall follow existing boundaries and be determined with regard to local feeling and historic developments so far as may be consistent with considerations of administrative convenience.'"

After some discussion the amendment was agreed to. The amendment was then divided on as a substantive motion, when there voted for it, 65; against, 44.

The Council adjourned soon after seven o'clock.

THE BRIGHTON-ROTTINGDEAN ELECTRIC RAILWAY.

As nearly the whole of the track of this extraordinary railway has been completed, and as the company state that they expect to open it next June, a short description of it will be of general interest. The railway runs from the end of the well-known electric tramway to Rottingdean, a distance of three miles. The rails are laid along the shore just above low-water mark, their distance from the cliff being about 200 yards. There are two pairs of rails, 18 ft. being between the two outermost and 2 ft. 8½ in. between each pair, and the car runs on all four rails at once. At high water the rails will sometimes be submerged 14 ft., so it is evident that the car must be a very odd one. It is a kind of movable platform on four tall legs, the platform, which is 50 ft. long by 22 ft. broad, being at a height of 24 ft. above the rails and 10 ft. above the sea at high water. On it there is a saloon 25 ft. long by 12 ft. broad, on the top of which are seats. The legs are of 12-in. steel tube, and are supported on bogey trucks which have four wheels each. The whole structure is more like the head of a pier than anything else. It is made to carry 150 passengers and two large motors, so it is calculated that when it is loaded it will weigh nearly sixty tons.

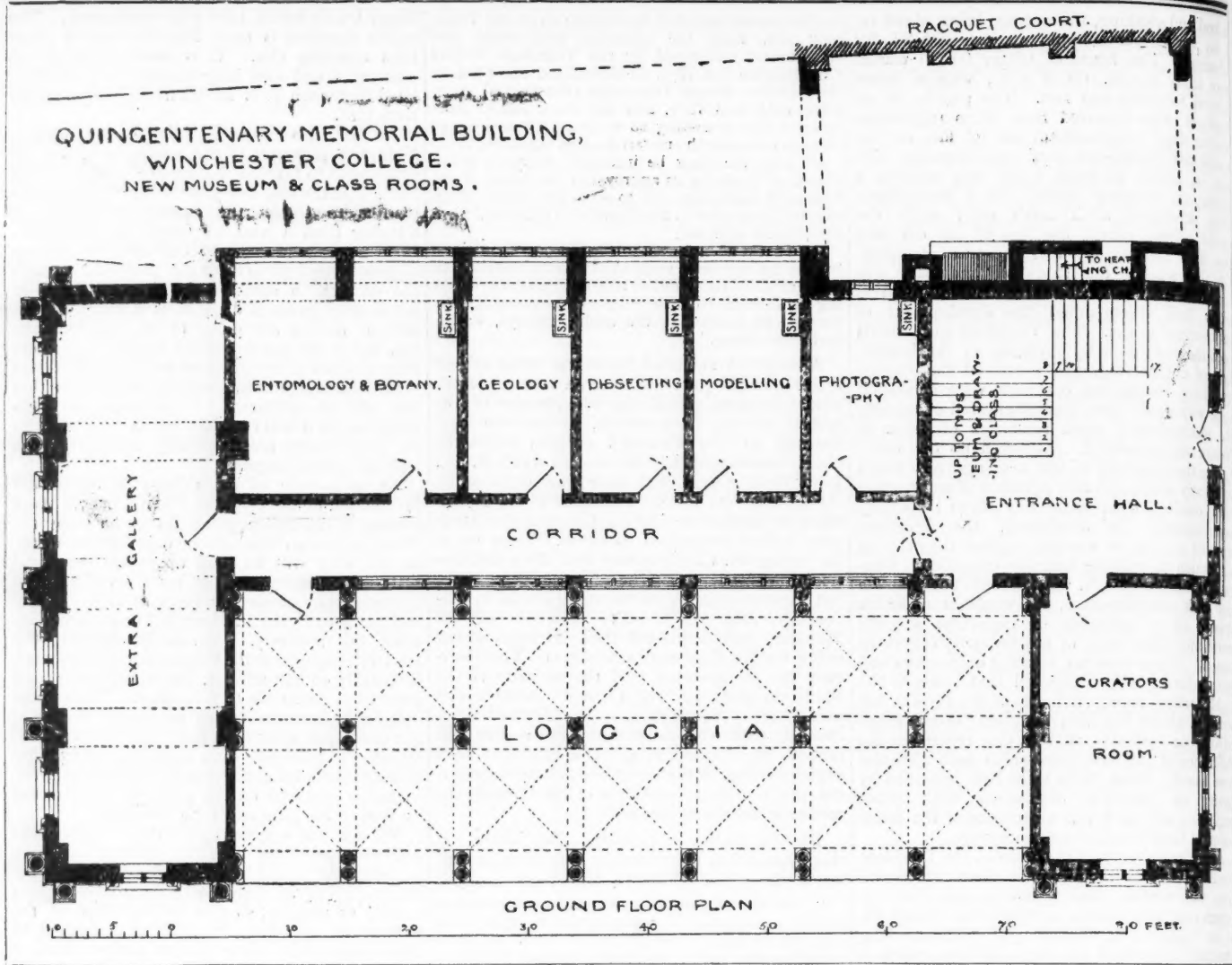
At first, it was the intention of Mr. Magnus Volk, the promoter of the company, to use accumulators to provide the motive power, but he found that the cost was prohibitive. The present plan is to collect the current by means of a trolley from a wire supported by steel posts. It is no easy problem to calculate the amount of power required to drive this pier-head through the water at a speed of six miles an hour—in fact a rough guess is all that is possible. Two 30-h.p. motors are going to be placed on the car, and as the power exerted before the motors have attained their full speed will be much greater than the nominal horse-power, it is thought that this will be sufficient. If no unforeseen difficulties occur it will certainly be an odd sight to see this moving island gliding through the sea with its 150 passengers.

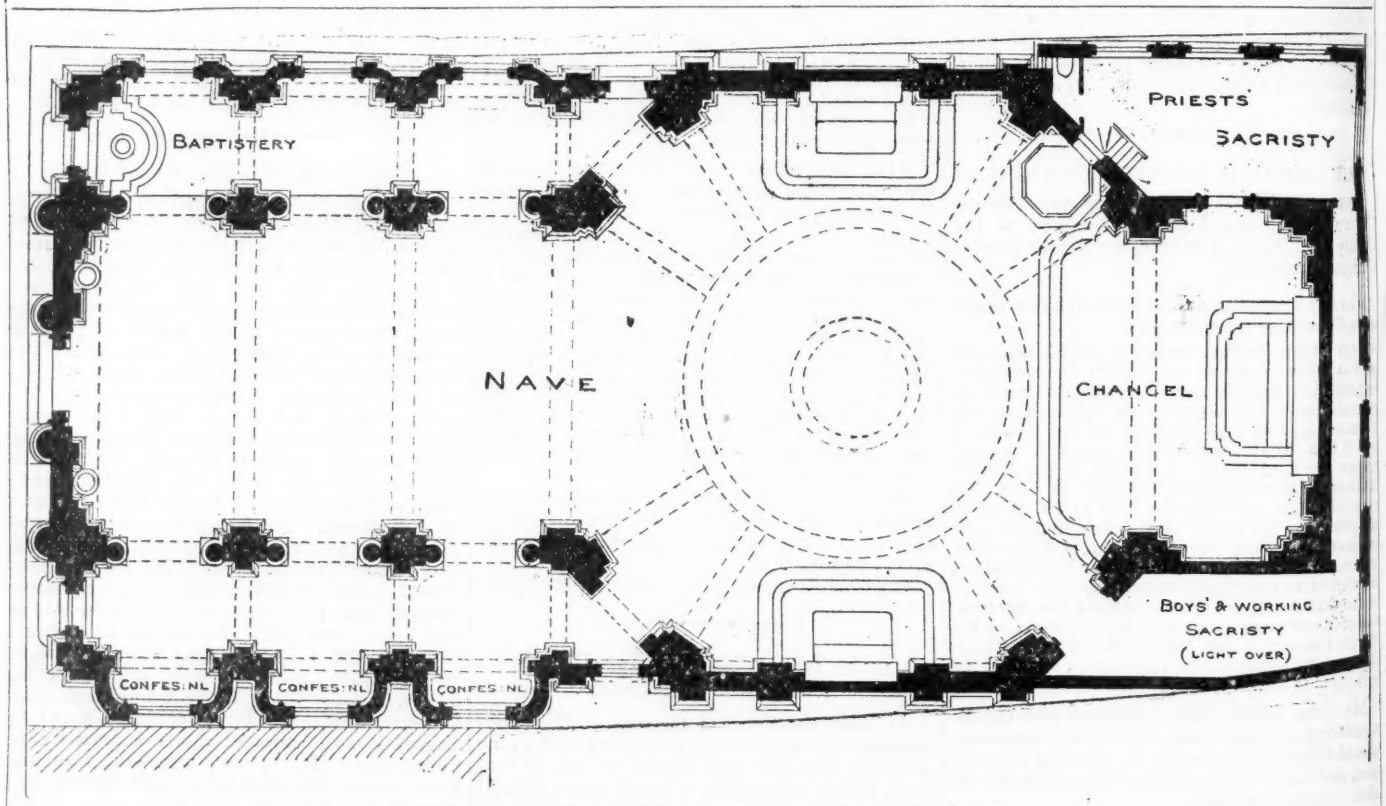
As half-a-mile of the railway is within the jurisdiction of the Brighton Town Council, their consent to the trolley poles has to be obtained. There seems no insuperable objection to them, as the wire will be well above the masts of little sailing-boats, and the posts could each be illuminated by an electric lamp at night. They will not beautify the foreshore, but no one seems to mind this seriously. Mr. Arthur Wright, the electrical engineer to the Corporation, has reported favourably on the scheme, but thinks compressed gas-motors preferable to the trolley. The general opinion however, seems to be against the use of gas-motors, as apart from the refusal of the manufacturers to guarantee such large engines working under these novel conditions it is thought that the vibration produced on the girder-built car would be fatal to the pleasure of the passengers.

We are not surprised that the Town Council are much perplexed over this scheme, but there is something cynical in the proposal of one of the aldermen that the company be required to deposit 1,000*l.* as security, so that in the event of the railway not answering, it could be compelled to clear away all the *débris* so as to leave no trace of this peculiar railway for visitors to scoff at. It seems a little hard that a company who are doing their best to attract visitors to Brighton should be looked on with such suspicion, and that uncalled-for obstacles should be put in their way.

ARCHÆOLOGICAL SOCIETIES.

BRITISH ARCHÆOLOGICAL ASSOCIATION.—The first meeting of the new session of this Association was held on the 6th inst., at 32, Sackville-street, Piccadilly, Mr. C. H. Compton, Vice-President, in the chair. The Hon. Sec., Mr. Patrick, expressed the great sorrow he felt in making the formal announcement to the meeting of the irreparable loss the Society had sustained by the lamented death of Mr. E. P. Loftus Brock, F.S.A., the Hon. Treasurer. The Chairman and Mr. W. de Gray Birch, F.S.A., also with much feeling made reference to the sad event and spoke of the great services rendered to archæology by the deceased gentleman during the period of nearly thirty years in which he had been connected with the Association. The intimation was received by the meeting with most sincere regret. Proceeding to the business of the evening, the Chairman exhibited a cast of a very interesting and rather unusual seal connected with Rievaulx Abbey and read some notes preparatory to a future paper on the subject. Mrs. Collier brought for exhibition a small collection of bronze tokens, mostly from Warwickshire and Staffordshire. Mr. A. Oliver produced two very elegant Roman lamps of rather unusual design from Corfu. Mr. Patrick, hon. sec., exhibited some Roman fibulæ of silver and bronze, and some beads, hair-pins, and dice, some of the latter showing distinct evidence of having been plugged, also an elegant little bronze figure of the infant Hercules brought from Italy. Owing to the unfortunate indisposition of the authors of the two papers advertised for the evening they were not completed, and stand postponed. Mr. Patrick then read a short paper upon Winchester House, Southwark, and the recent discoveries of some remains of the buildings, which he illustrated by some old engravings and maps and a plan of the locality. An interesting discussion ensued, in which Mr. R. W. Barrett took part, and afterwards drew the attention of the meeting to the nature of the excavations in progress upon the line of the Roman wall in the North of England, which he had quite recently visited.





Church of the Holy Redeemer, Chelsea: Plan as originally designed.

Illustrations.

PART OF FRIEZE, SHEFFIELD TOWN HALL.

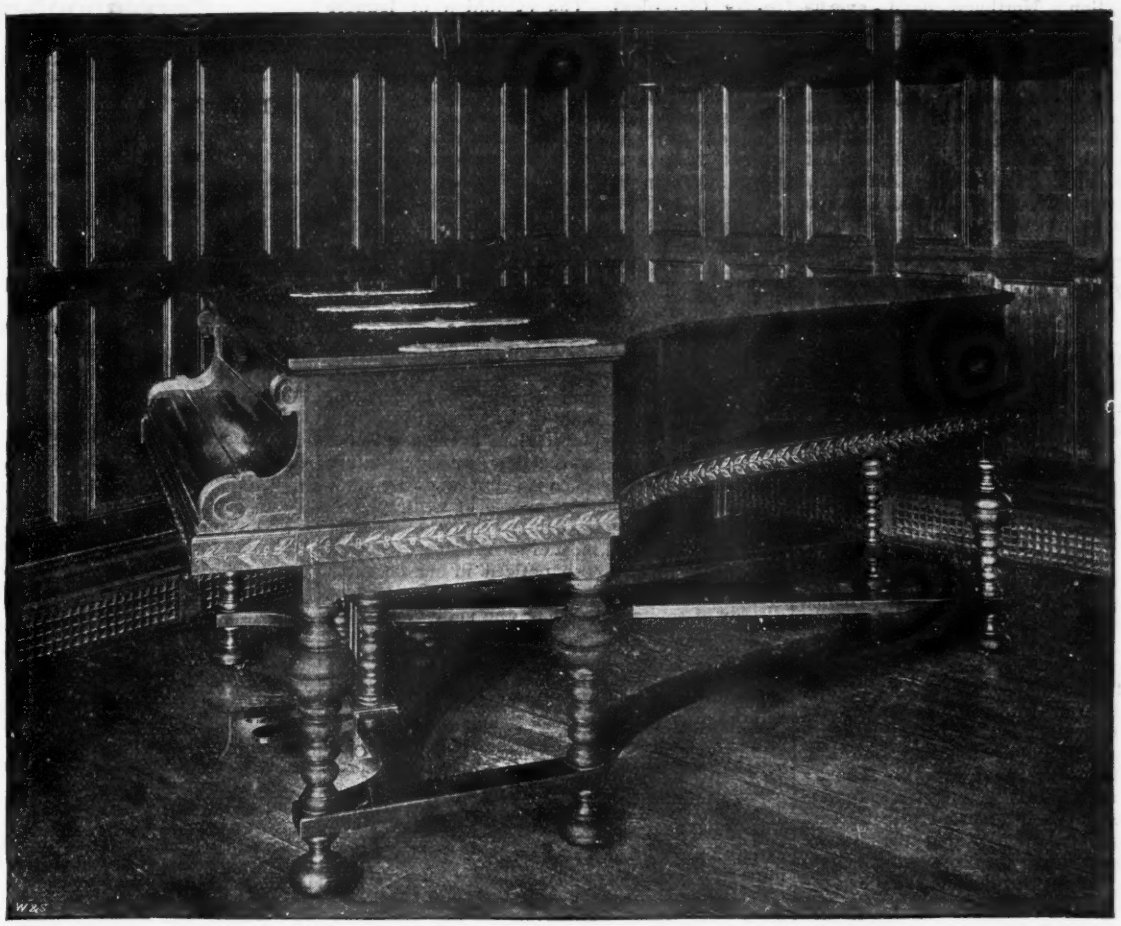
IN the *Builder* for July 13 we gave an illustration of the portion of the sculptured frieze, by Mr. F. W. Pomeroy, which is on the right hand of the principal entrance to the Sheffield Town Hall, and which represented or symbolised various forms of labourers' work. We are now enabled to give an illustration of the other half of the frieze, which has since been completed—the portion on the left side of the entrance, and which is intended to represent the principal arts and crafts of Sheffield.

A female figure symbolical of Fame leads the way; the three figures immediately following represent Architecture, Sculpture, and Painting; a figure following these and holding a model of the figure of a boy is taken from one made by Alfred Stevens for the Green Lanes Foundry; other figures represent the working of the precious metals. The group of female figures are the electro-platers and buffers; following these are figures carrying ivory tusks, a circular saw, and cases of cutlery; and at the end of the composition is represented the export of the various wares for which Sheffield is celebrated.

QUINGENTENARY MEMORIAL BUILDINGS, WINCHESTER COLLEGE.

THESE buildings are being erected, from the designs of Mr. Basil Champneys, out of a fund raised by old Wykehamists as a memorial of the "Quingentenary" or five-hundredth anniversary* of the foundation of the College. The material

* "Quin-centenary" would seem to us to be a better word, more in accordance with the expresssions "bi-centenary, ter-centenary," which are in habitual use.



Piano made by Messrs. Broadwood. Designea by Mr. G. Henschel.

is specially made brick, which works six courses to the foot, and Ancaster stone. Mr. Kimberley, of Banbury, was the builder, and Mr. W. Simpson the clerk of works.

The drawing was exhibited at the last Royal Academy Exhibition.

CHURCH OF THE MOST HOLY REDEEMER, CHELSEA.

THE illustration we publish this week is the one promised in our issue of October 19, when we made some further remarks on our article of the week before on "A Question of Church Style."

It is to show that Mr. Goldie's first idea for the church was not open to the criticism we made on the actual building as having the appearance of a concert-room or town-hall.

This illustration is taken from Mr. Goldie's original design, which was modified, as stated in our issue of the 19th ult., "partly on the question of cost, which led to the abandonment of the dome, partly the necessity of contracting the site in accordance with the requirements of the London County Council in regard to the boundaries of the site and the width of the adjoining road." The materials generally would have been the same as in the church now built, which we illustrated on October 12.

DESIGN FOR TERRACE, STOKE NEWINGTON.

THE accompanying design for a terrace of houses was exhibited in the Royal Academy Architectural Room in 1894. Small plans of two floors showing the proposed treatment of one division of the building are given above the elevation. The architects are Messrs. Booth & Anderson.

BUILDERS' BENEVOLENT INSTITUTION:

ANNUAL DINNER.

THE annual dinner of the supporters of the Builders' Benevolent Institution took place on the 7th inst., in the Hall of the Carpenters' Company, London Wall. Mr. John Mowlem Burt, J.P., D.L. (President), occupied the chair, supported by Mr. E. Smith, the Master of the Carpenters' Company, Mr. J. C. Preston, Clerk to the Company, Major Isaacs, Messrs. T. F. Rider, J. Randall, L. J. Maton, C. B. Trollope, H. Northcroft, G. Burt, C. Bird, T. Hall, C. Bussell, J. W. Duffield, J. Pearson, T. Stirling, Higgs, J. T. Bolding, Henslow, and other friends of the charity, the company numbering about 160.

The usual loyal and patriotic toasts were duly honoured, Major Brutton responding for the "Army and Navy," and Major Charles Bird for the "Auxiliary Forces."

The President, in proposing the toast of the evening—"Success to the Builders' Benevolent Institution"—said it was not very often that they, "brother-chips," met round the festive board and enjoyed one another's company as they were doing that evening. They occasionally ran a little counter to one another's wishes, but they could have only one feeling in regard to this charity. It was usual on such occasions to submit a long string of facts and figures. He, however, would not trouble them with these, but would content himself with asking them to open their hearts and purses, and do all that they could for an institution which was doing its level best to provide for those who had seen brighter days, and to aid in bridging over the period between their active life and the time when they would be no more. He believed he had circulated more than 3,000 appeals for the Institution, and if these brought in only a pound a-piece it would largely benefit the charity. He would, however, leave it to the good sense and generosity of his hearers to do the very best they could, and he would couple the toast with the name of Mr. George Plucknett, the hon. treasurer, who had done such good work for the Institution, but whose health, he regretted, would not permit him to be present.

The toast was drunk with enthusiasm.

Mr. Maton gave "The Worshipful Company of Carpenters." The Company had not only given the use of their magnificient hall, but they were generous supporters of the charity. He believed, too, that none of the City Companies had done more to further the particular trades with which it was connected than the Carpenters' Company.

Mr. E. Smith (Master of the Carpenters' Company) replied. He said that the bond of union between carpenters and builders was a close one, and it was most fitting that these banquets should be held in that hall.

Mr. T. F. Rider, in an amusing speech, gave the toast of "The President." The toast was well received, and the President briefly replied.

The President next gave "The Architects and Surveyors"; adding that not a few of the names in the contribution lists belonged to these bodies.

Major Isaacs replied for the architectural profession, and spoke of the friendly feeling that should always exist between its members and the builders.

Mr. C. B. Trollope replied for "the Surveyors." For many years he had had a large practice, and he had the deepest gratitude for the builders, from whom he had received every support.

The President proposed the toast of "The Visitors."

Mr. White, L.C.C., in replying, said that his sympathies were entirely with the builders, knowing as he did the hardships and difficulties they had to contend with. The ratepayers were paying much more than the value of the large works now being carried out by the London County Council, and he was doing all that he could to alter the conditions imposed upon builders.

Mr. C. Preston (Warden of the Carpenters' Company), gave "The Vice-Presidents, Committee, and Stewards," to which Mr. Alexander Ritchie and Mr. Lough responded.

In the course of the evening, donations were announced amounting to 1,064*l.*, of which the large sum of 897*l.* appeared in the President's list.

MR. HENSCHEL'S NEW PIANO.

THE Pianoforte illustrated above has been made by Messrs. Broadwood for Mr. Henschel, the eminent singer, musician, and conductor, under his directions and after his own sketches. As will be observed, he has given another new suggestion in the treatment of the legs of the piano. The case is a comparatively simple one in regard to decorative treatment; it is in solid oak, merely relieved by a floral ornament incised in a band round the lower margin of the case, and a little carved scroll-work at the extremities of the keyboard. The hinges of the lid are ornamental and of wrought-iron. We very much question the advisability of the introduction of these large metal hinges on the case of a piano. All metal, except that which is necessarily used in the internal construction, is better away. The slightest working loose of these hinges in process of time would lead to jarring.

COMPETITIONS.

SEWERAGE AND WATER SUPPLY, LINSLADE.—The Linslade Parish Council, at a meeting on Friday last week, awarded the first premium for the competitive designs for the sewerage and water supply of the district to Messrs. R. B.

Grantham & Son, Northumberland-avenue, London, and the second premium to Mr. H. B. Nichols, of Birmingham. The rateable value of the district is about 20,000*l.*, and the estimates of cost varied from about 3,200*l.* to 9,900*l.*

COUNTY SCHOOLS FOR GIRLS, BANGOR, NORTH WALES.—We are informed that the designs submitted in this competition by Mr. J. H. Phillips, architect, Cardiff, were placed first by the assessor, Mr. W. D. Caröe, Surveyor to the Charity Commissioners.

ARCHITECTURAL SOCIETIES.

SHEFFIELD SOCIETY OF ARCHITECTS AND SURVEYORS. — The monthly meeting of this Society was held at the School of Art on Tuesday evening. The chair was occupied by Mr. Charles Hadfield, the President, and Mr. Paul Waterhouse, of London, read a paper on the "Brotherhood of Architects." In his opening remarks he pointed out that isolation is no more possible to the architect than to human beings generally; but that he is inseparably connected with his fellow craftsmen in the present and the past. Other branches of art, said the lecturer, may rival our antiquity at least in appearance, but none have so completely carried down an identity of tradition from the ancients. This link of union with the past involves a great responsibility, and carries with it the necessity for two attitudes of mind, dignity, and study, each of which is the cause and the result of the other. The best and greatest architects have always humbly followed tradition, however powerful in inventive faculty. The cry for a new style argues in the utterer a complete ignorance alike of the history and principles of architecture, and the theory that because we cannot see progress in our modern work it is non-existent, proves that the theorist knows little of the fundamental natural law that true and wholesome growth is in all departments almost invariably invisible as a process, though measurable as a result. For this reason efforts at invention in art are almost always failures, even when put forth by a Michelangelo. The old Greek doctrine of virtue as a mean has a cogent modern truth. With the men of to-day, architects have a no less vital unity than with those of the past. We influence one another directly by pupilage, indirectly by example, and the latter influence is readily open to abuse. No ideas should be appropriated either from the ancients or the moderns without previous digestion. In fact an attitude of generous criticism, that is of analysis, is the proper highway to intelligent design. We need have no fear because our designs bear a certain similarity to the works of the ancients or moderns if in other respects they are sound. The architects of old had no such fear. The use of traditional form and of proper local method, so far from being a sign of poor invention, may often be the index of a masterly modesty. The reader of the paper concluded with an account of the modern growth of social organisation among architects, and with an appeal for the enthusiastic maintenance of that organisation, and the brotherly unity of which it is the instrument and effect. Speaking of the alliance of the various English societies, which is such a remarkable modern development, he emphasised the constant readiness with which the spirit of that alliance is recognised by the Metropolitan body, the Royal Institute of British Architects. The alliance and the sense of co-operation which it involved was, he said, justly and openly acknowledged as one of the firmest foundations of the Institute. While congratulating the Society on the fact that so many of its members were also members of the central body, he urged upon all present the desirability, the necessity of promoting by every possible means, by personal influence, and by personal enthusiasm, such a spirit of unity and mutual assistance as would most truly make for the ideal Brotherhood of Architects. A very cordial vote of thanks to the lecturer was proposed by Mr. F. Fowler, seconded by Mr. E. M. Gibbs, and supported by Mr. C. J. Innocent, Mr. J. B. Mitchell-Withers, Mr. Thos. Winder, Mr. A. J. Greenwood, and carried unanimously; and in acknowledging it, Mr. Waterhouse said he looked forward to the time when membership of the Royal Institute of British Architects would be looked upon as the nearest approach to a guarantee of fitness to practise as an architect.

THE LAUNDRY EXHIBITION.

THE third annual Laundry, Sanitary, and Engineering Exhibition has been held this week in the Agricultural Hall, Islington, and will close to-day (Saturday). The exhibition of laundry machinery and accessories required for washing appears to be unusually complete, and the contents embrace every branch of laundry work and a large quantity of machinery. The exhibition appears to be one of the most successful of its kind, and at the time of our visit the whole of the ground floor of the hall was occupied by stalls which were in charge of representatives of the exhibitors, and were not, as is so often the case at similar exhibitions, managed by someone who is responsible for more than one stall, and who knows little or nothing about some of the goods which are on view. But good as the exhibition is, it would have been improved had the promoters excluded those exhibits which have no connexion with laundry or sanitary or engineering work, and had endeavoured to let the space thus gained to the exhibition of more goods that do, for if the word "sanitary" in the title of the exhibition is not employed alone in relation to the laundry, then there are few purely sanitary exhibits, and if it is, then it is unnecessarily used, for all laundry appliances should be sanitary.

There are not many exhibits that we can refer to in our pages, and most of those that we can deal with have already been noticed in our accounts of previous exhibitions. The large and excellent display of sanitary goods at the stall of Messrs. Twyford's, of Hanley, deserves special notice. This firm is exhibiting some very good white enamel hospital sinks, domestic baths, closets, urinals, wash-tubs (in white enamel and yellow-glazed fireclay), and school lavatories. They also show some very massive white enamel urinals, suitable for railway stations, with special provision for flushing, and with an inset of mosaic work at the foot to prevent slipping—a small but a practical feature. The combined lavatory-basin and urinal, with a cast-iron back containing a mirror, is not so good; the ironwork does not seem to combine well with the stoneware, and has a rather meagre appearance. But altogether Messrs. Twyford are to be congratulated upon such a large and fine collection of sanitary goods.

Messrs. Doulton's, of Lambeth, also show some very good white and cream enamel and yellow glazed fire-clay wash-tubs, and pedestals for supporting them, rinsing troughs, slop sinks, &c., as well as their well-known water-softening apparatus, which has been exhibited at previous exhibitions and has already been described in our columns. The enamel wash-tubs are a great improvement, from a sanitary point of view, over the old wooden and zinc tubs which are still largely used; the wooden tubs have joints and corners where dirt or germs may accumulate and the zinc ones are affected by acids. The firm shows two forms of their water-softening machine, one for use where the height of a room is limited and the other where the height is not of importance but where the ground space is limited.

The Blackman Ventilating Company, Limited, have on view a working model of their well-known system of ventilating and rapid drying, which has been previously described by us. Messrs. Seagrave & Bevington (Glover & Hobson, of London), also exhibit a hot-air drying apparatus.

Messrs. Julius Sax & Co., Limited, have a well-arranged stall where they exhibit electric light fittings, &c.

Mr. Sam Deards, of Harlow, shows the "Little Samson" Hot-water Heater, as well as a model of his patent glazing for greenhouses, &c., without putty, paint, springs, lead, or india-rubber.

Among other exhibitors we may mention the Eagle Range Company; J. A. Mawson, Bolton (the new "Coil" rapid water-heating apparatus); Messrs. Caddy (tubular and chilled fire-bars); Messrs. Rhodes & Son, London (gun-metal valves for lavatories, baths, &c.); and Messrs. W. Williamson & Co., High Holborn (the "Pick-up" ventilating fan.

An interesting feature in the exhibition is the model laundry shown by Messrs. Williamson & Co., of Holborn, in which every department of a large laundry is shown.

LLANTHONY PRIORY, WALES.—On page 309 *ante* we gave some remarks on these remains, in relation to a statement that the nave of the ancient Priory Church had been restored and roofed. The statement appears to have originated in a mistake in a daily newspaper; it struck us as rather a surprising one at the time. What has really been done is the restoration of the small Parish Church of Llanthony, which stands close to the Priory ruins. This was done under the supervision of Mr. Spencer, architect, of Abergavenny, to whom we are indebted for the correction of the mistake.

Correspondence.

To the Editor of THE BUILDER.

THE NEW ARTIFICIAL STONE.

SIR,—Will you kindly extend to me the courtesy of replying to a letter appearing under the above heading in your last issue?

Without commenting on the bad taste and all the misleading statements contained in that letter, I beg to say—

1. My patent stone (Patent dated October, 1894) is not the property of the syndicate mentioned.

2. Sufficient time has elapsed for anyone aggrieved by my successful invention to test its validity in the usual manner, without resorting to this cheap method of doing me an injury by making random statements in your columns.

51, *Mervan-road, S.W.* W. OWEN.

*** We give Mr. Owen his reply, of course; but it appears to us, on comparing the description of his stone with that which we gave of the process of the Sandstone Syndicate in our issue of December 2, 1893, that they are very nearly the same thing. The question of the infringement of rights is of course for the patentees to deal with themselves. We have merely, as in other cases, reported on a prospectus and process brought under our notice.—ED.

MODERN BUILDING.

SIR,—Mr. Lethaby's interesting remarks last Saturday naturally "give one pause" and set one thinking as to the why and wherefore of the necessity of these discussions. Perhaps, Sir, Mr. Lethaby, like all enthusiasts, is liable to underestimate the moulding force of the conditions under which we live.

With the general gist of his remarks that the designer and the craftsman should be brought more in touch with one another most agree; but to go further, and to do away with the designer altogether and to make the craftsman such, is a theory which sounds very well perhaps, but is it one which could be made to answer the requirements of the day? Is it not just as reasonable to assert that a general must be as good a marksman as any soldier in his army, or that an admiral like Nelson, with only one arm, and with intermittent attacks of *mal-de-mer*, was no sailor? In other words, is *thought*, as such, to count for nothing? Mr. Lethaby seemed to infer that architecture in the past has been produced without the preparation of drawings—in other words, largely without previous thought.

Although this would appear doubtful, are the cases similar? Is it not necessary to differentiate between the requirements and civilisations of, say, the fourth century B.C. and the thirteenth and nineteenth centuries A.D.? Presuming, in fine, that it would be possible to erect the comparatively simple buildings in the earlier periods without the careful thought necessary to place them on paper, are we to be denied the undoubted good to be obtained from such a process, or to continue to practise in the nineteenth century a custom which may have answered more primitive conditions?

The needs of our complicated civilisation demand such a method to bring itself into line with modern wants. It is no more possible to return to effete manners and customs in building than it is necessary to go about in leather jerkins, booted and spurred, in order to grasp the *principles* which have produced the glorious art of bygone ages. It should be just as possible to produce a beautiful building under the contract system, properly controlled, as by the slave labour of the Greek period, the military system of the Roman legions, or the feudal servitude of the Middle Ages. The crux of the situation seems rather to lie in the separation of architecture and engineering, a state of things which has no counterpart in the past. Constructive necessities properly met and encountered have been in past ages the greatest stimulus to architectural design and progress, and when this stimulus is taken away from architecture it ceases to have any propelling power.

In short, Sir, the fusion of architecture and engineering, as in past times, would seem to be the only way out of the present condition of things, for it has been concluded, not without reason, that architects are not sufficiently scientific and that engineers are not sufficiently artistic. To produce an architecture expressive of the intellectual and material movement of the age we must certainly seek it no longer by mingling all the styles of the past, but by novel principles of structure.

BANISTER F. FLETCHER.

Junior Athenæum Club.

BUILDERS' CLERKS' INSTITUTION OF GREAT BRITAIN.

SIR,—I beg to inform you that the next meeting of the above Institution will be held at the Westminster Town Hall, Caxton-street, Westminster, S.W., in room No. 13, on Saturday, November 23, at 6 p.m.

It is hoped by the committee that all those

engaged on the staff in builders' offices will attend, and bring with them their fellow clerks engaged in the trade.

Prospectuses can be obtained on application to the undersigned. J. PEARSE BOWDITCH,
94, Dalberg-road, Brixton, S.W. *Secretary, pro tem.*

The Student's Column.

METALS USED IN BUILDING.
XIX. AND XX.

TIN ALLOYS (*continued*).

TIN AND ANTIMONY.—This alloy may be produced either by fusing the two metals together, or by reducing sulphide of antimony in contact with tin. The substance known as Britannia metal is composed of (1) varieties of tin hardened by antimony, (2) an alloy of tin and antimony in the proportion of about 20 per cent. of the latter, or (3) the same, with a small amount of copper added. A common variety is composed of 350 lbs. best block-tin, which is melted and raised to a dull red heat, when 8 lbs. of melted copper are added, the whole being thoroughly stirred to promote thorough incorporation, then 28 lbs. antimony and 8 lbs. brass in a molten state are introduced. The brittleness of such alloys is, naturally, increased with the proportion of antimony, and expansion takes place as the alloys are purer. An extreme limit for tin-antimony alloys is reached with a metal made of 67 per cent. tin to 33 per cent. antimony. A ductile substance is 10 parts tin to 1 of antimony. The addition of iron and zinc is very objectionable in Britannia metal, though often found; they materially increase the hardness and brittleness of the alloy; and it is generally admitted that if much zinc is employed (as in the manufacture of cheap material) the antimony must be proportionately lessened. Lead is not bad from the metallurgical standpoint, but it seriously impairs the lustre of the compound if the latter be required for ornamental purposes.

Tin, Copper, and Zinc.—This alloy has been extensively investigated in the United States, more particularly by Professor Thurston, who found that the alloys of maximum strength are grouped about a point not far from copper 55, zinc 43, tin 2, as shown upon a triangular model in which the different degrees of strength are exhibited by different degrees of relief or elevation above a common base. An alloy of this composition, if fairly good metals are employed, and the proportions are accurately made, well melted, perfectly fluxed, and so poured as to produce a sound and pure metallic substance, with such prompt cooling as shall prevent liquation, is the strongest variety of this useful alloy that can be made.

Tin, Lead, and Zinc.—The addition of lead to tin-zinc alloys imparts more resistance to the whole. The following table is from one drawn up by M. Guettier* :—

	Tin.	Zinc.	Lead.
1	76	12	12
2	12	76	12
3	12	12	76
4	34	33	33
5	10	45	45
6	45	45	10
7	45	10	45

Nos. 2 and 3 are both adapted for castings, and are better for that purpose than either of the metals considered separately. Nos. 2, 4, and 5 possess more resistance than pure zinc, whilst Nos. 1, 3, and 7 are specially intended to withstand friction. No. 6, however, is the most useful for our purposes, the others being too soft or brittle; that is excellent for small castings for ornamental and decorative work. They all possess the great disadvantage of becoming rapidly tarnished under atmospheric influences, a circumstance, however, that does not seem to prevent their extensive use when made up in imitation of higher class metals.

Tin and Iron.—Tin even in small proportions is injurious to iron. Karsten found that 1 per cent. of tin added to iron made the latter extremely brittle when cold, but not when hot, for the iron could be forged though it gave out white vapour which condensed on the anvil. Again, Mr. Billings ascertained† that an almost insignificant quantity of tin, in the absence of other metals, renders iron cold-short, and has a most harmful effect.

Tin-plate.

In the last article we briefly alluded to terne plate alloy, which, being much cheaper than pure tin, is often substituted for it in coating iron. In view of the great importance of the tin-plate industry in England (from whence it is exported in great quantities), and its applicability for certain building purposes, though not of a very high order, we may give the following details.

The first record of the manufacture of tinned-iron plates refers to Bohemia, where they were made prior to the year 1620. Subsequently, the art found its way into Saxony, from which country it was introduced into England in 1670, though the industry was of very insignificant proportions until its firm establishment here in 1720. It developed chiefly in Monmouthshire, and the chief centres of production at the present time are in that county, South Wales, Staffordshire, and Worcestershire. It has been estimated that the tin-plate industry of Great Britain consumes annually nearly 500,000 tons of pig-iron, 1,000,000 tons of coal, and about 10,000 tons of tin, besides large quantities of sulphuric acid, lead, &c. Until within the past few years charcoal or coke iron bars were considered to be the only kind of iron suitable for making the plates, but now soft steel or ingot-iron bars have taken their place to a large extent. Many tin-plate manufacturers have erected their own steelmaking plant. The tin is distributed evenly over the sheet, and can be applied thinner than formerly by rolling processes. Another process* which has been in existence about twelve years, consists in operating by mechanical means upon the sheets of metal emerging from the bath in which they are coated, which tends to give a better finish than would otherwise be obtained. This is accomplished by causing the sheets as they come out of the bath to be guided by rollers covered with molten grease so as to avoid exposure to the air, between washing rollers kept covered with molten metal. The washing rollers do not bear on the sheet, but are so closely adjusted as to wash off the scum and refuse on its surface. On leaving the rollers the plate, still passing through a bath of grease to prevent exposure, is sent through finishing-rollers to remove the excess of metal, and finally through a pair of improving-rollers, which bear against each other by means of springs, and thus lightly nipping the sheet between them impart a smooth surface and finish to the metallic-covered sheet.

It is widely believed that the tin imported into this country from the Malay Peninsula and Australia is more suitable for tin-plate work than that raised in Cornwall. It is stated that the latter is not so fluid, nor so soft, and will not cover so large a surface of plate as the imported tin. We imagine, however, that a great deal depends on the particular variety of Cornish tin and the relative purity, or ultimate composition when smelted.

LEAD ALLOYS.

Some of these have been treated under other headings when the proportion of lead was subordinated to the other metal, or metals, in the alloy, or when dealing generically with a particular type of alloy of which lead was only an accessory constituent.

Lead and Antimony.—The prime object of adding antimony to lead is to harden it, though if too much be mixed the result is a hard, brittle, and crystalline mass of metal. A good alloy is lead with one-third or one-fourth of its weight of antimony; another, two parts lead, one of tin, and one of antimony; a third, fifteen parts lead to one of tin, and four of antimony.

Lead and Copper.—To effect a perfect union between these two metals they must be used in definite proportions. Mr. Hiorns remarks that when lead is in excess the metal largely separates from the copper, or becomes much oxidised if the temperature be too high; so that these alloys are made best when a large percentage of copper is present. Lead is frequently added to certain copper alloys, such, for instance, as brass required for turning, as it renders them more fusible and more easily worked with cutting and abrading tools.

Lead and arsenic form a hard and brittle alloy, used in shot manufacture; lead and iron alloyed are not of much use in the arts, though the want of affinity between the two is sometimes taken advantage of in metallurgical operations, in separating iron from other metals; lead and bismuth unite by simple fusion. But none of these mixtures are important as metals used in building.

The Uses of Lead and Lead-composition.—It will be convenient at this stage to give a brief account of the uses of lead and its compositions in the building industry. One of the foremost that will occur to the student is its employment for lead pipes. A large proportion of the lead used in pipes so-called is extensively alloyed with other metals, but the result of the union from the manufacturing point of view should not materially affect the softness and plasticity of the whole. Thus we frequently find small quantities of zinc and tin employed; and the "lead pipes" turned out from some works are made of metal of a leaden hue only—the cheap composition being extremely complicated. Confining our attention, however, to lead pipes in which the metal is fairly pure, it may be remarked that these have been much used and are (to a greater extent than is generally believed) still employed for water service. The action of hard water, that is water containing large quantities of carbonate of lime or magnesia, or both, on lead pipes is practically *nil;* but the effect of soft water on the pipes often leads to lead-poisoning. If soft water remains in contact with the lead for any length of time, the oxygen held by the water tends to convert a portion of the lead into oxide of lead, which is dissolved by the water. This action is promoted most vigorously on bright, recently-cut surfaces of the pipes, as when first put in, or after repair. If the pipes were coated internally by other mineral matter deposited by the water, the deleterious action alluded to would be reduced to practically unimportant dimensions. But this is frequently not the case, hence the recurrence of lead-poisoning in towns where very soft water is supplied. It should be remembered that even if a very minute portion of the oxide of lead is dissolved in this manner from pipes per diem, the lead tends to accumulate in the system, and repeated doses of it may give rise, in course of time to excruciating pains internally, if death does not result. This fact has been known for many years, and remedies have, after a fashion, been adopted. In such localities the use of lead pipes for the conveyanee of water, or for cisterns, has either been done away with, or the pipes have been coated internally with tin or some similar metal or composition. Except that their plastic properties are often much modified the use of lead compo-pipes are, therefore, much to be preferred as tending to diminish the indirect action of the water. For our own part, however, we should like to see pipes in which lead enters materially into the composition, abolished altogether for water-supply purposes, and some of the many other harmless metallic pipes on the market substituted therefor.

But little need be said concerning lead employed for roofing purposes. In general its great weight (specific gravity, 11·4) is against it for ordinary roofs, even if prices were not prohibitive; whilst its low melting-point renders it extremely dangerous in conflagrations. Lead sheets used for roofing frequently buckle, in a similar manner, to the lead linings of domestic scullery troughs; this is doubtless due to continued expansion and contraction consequent on alternations of temperature of the air in the one case, and the intermittent action of hot and cold water in the other.

The use of lead as a glass-making material is an English invention of the seventeenth century, and grew out of the use of mineral fuel in glass-manufactories in place of wood. This fuel required pots to protect the glass from impurities found in the coal, and this shield so reduced the temperature that reached the glass making silica, &c., within it as to demand a better flux; and lead, which is a powerful flux in this connexion promoted fusion at a lower temperature. The result was the production of a fine quality glass. Glass made with lead is more dense, has a greater power of refraction, and is less liable to breakage from sudden changes of temperature than either soda, potash, or lime glasses. It is soft and easily worked, but is of surpassing brilliancy and transparency.

Lead as a glazing material has, for centuries, been employed for stained-glass windows.

White lead forms the base of many mineral paints, and red lead, already described, is put to many uses by the engineer and the gasfitter—especially in the suburbs—but it may be charitable not to describe these in detail.

ALUMINIUM ALLOYS.

WE have already dealt at some length with aluminium itself—incidentally, also, we have touched upon a few of its alloys in illustration of the general applicability of the metal to build-

* "Guide Pratique des Alliages," 1865.
† "Trans. American Inst. Mining Engineers," Vol. v., p. 450.

* See "Mineral Resources U.S. for 1883-84," p. 636.

ing purposes. The student is requested to read that in connexion with the brief remarks which follow.

The union of aluminium with copper forms two distinct series of alloys, one of which is represented by aluminium bronze containing only from 5 to 12 per cent. of aluminium, the other is typified by copper-hardened aluminium with from 3 to 15 per cent. of copper. The aluminium bronzes have been referred to under copper alloys, and it will be remembered that they are very dense, fine-grained, strong and fairly ductile. The melting-point of bronze with 10 per cent. aluminium is about 1,700 deg. Fah.; a peculiarity of this alloy is that it is malleable at a red heat, rendering it more convenient to fashion it for divers purposes than other bronzes—none of the strong bronzes being malleable at a high temperature. A small percentage of aluminium added to the ordinary tin-antimony-copper Babbit metal increases the utility of that alloy for the hardest classes of machinery-bearings. Aluminium is regularly used in the United States in the manufacture of steel, the purpose of the addition being mainly to prevent the retention of the occluded gases in the steel, and thereby to yield more solid ingots. It appears, also, to give extra fluidity to the metal.

The addition of a small proportion of aluminium to ferro-manganese renders the combined carbon in the manganese alloy graphitic, and throws the carbon thus separated in a graphitic state out of the molten mass, useful in the production of low carbon steel. Added to cast iron it causes the iron to be softer, freer from shrinkage, and lessens its tendency to "chill." An alloy of 20 parts nickel and 8 of aluminium, and a peculiar one—a species of bronze—composed of 60 parts (or 40) cobalt, 10 parts aluminium, and 40 parts (or 30) of copper are comparatively recent inventions, stated to be of much value for minor metallic decorative purposes.

The alloy known as aluminium-Bourbounz is of considerable importance in France; its composition is aluminium, 85·74 per cent.; tin, 12·94, and silicon, 1·32. The special advantage of this is its capability to be cast in very solid shapes, the metal having very little shrinkage in castings. Small quantities of aluminium added to zinc renders fairly pure zinc much more efficient in galvanising, yielding a thinner, more tenacious, and finer-looking casting. Conversely, if up to 25 per cent. zinc is mixed with aluminium, the resulting metal is found to be much harder and stronger than pure aluminium in castings.

Perhaps the most unsatisfactory property of aluminium is the difficulty with which it is soldered. During the past two or three years great improvements have been effected in that direction, especially by the employment of phosphor tin solder, and one composed of 80 parts tin, 20 parts zinc, using a flux composed of 80 parts stearic acid, 10 parts chloride of zinc, and 10 parts chloride of tin. Tin of a high degree of purity has also been used as a solder; but the solders most commonly adopted may be summarised as follows* :—

Alloys for Soldering Aluminium.

Alloys.	Grains.	Fusing Point, Centigrade Degrees.
Tin	1,000	280—300.
Lead	50	
Tin	1,000	280—300.
Zinc	50	
Tin	1,000	350—400.
Copper	10—15	
Tin	1,000	350—400.
Nickel	10—15	
Tin	900	——
Copper	100	
Bismuth	2—3	

The last-mentioned solder is especially suitable for aluminium bronze. Chloride of silver as a flux in soldering has found much favour in recent years. It may be added that ordinary copper soldering bits discolour the aluminium, and bits of pure nickel which have been found to answer the purpose very well, are now almost exclusively employed. The great facility with which aluminium may be welded electrically is a property often used in substitution for soldering.

ALLOYS OF QUICKSILVER.

One of the most remarkable properties of mercury is its power of uniting with other metals at the ordinary temperature to form combinations termed amalgams; iron and platinum are practically the only metals in common use that will not yield to it. Some amalgams are solid, whilst others are fluid; the former are often of a crystalline nature, the latter may be regarded (doubtfully) as the solid amalgam dissolved in an excess of mercury. The bond of union in any case is of the slightest; in the majority of instances a fair proportion of the mercury can be divorced from the amalgam by pressure. A liquid amalgam may, after being made some time, become partly solid by reason of a portion of the mercury chemically uniting—or, at least, uniting in definite proportions—with the metal "dissolved," and crystallising out in the fluid, leaving the excess of mercury behind. That portion which has assumed the crystalline condition is the real amalgam.

We have stated that iron and platinum will not amalgamate with mercury, *i.e.*, under ordinary conditions; but they may be made to do so with great difficulty, and the same can be said of cobalt, nickel, and manganese. Gold is easily penetrated by mercury; as a matter of general interest it may be noted, for instance, that if the surface of a gold ring is allowed to remain in contact with mercury for a short time the precious metal is rendered so brittle as to become useless.

Tin-Amalgam.—This forms an interesting and useful alloy, though not so extensively employed as formerly. A mixture of 1 part tin to 10 of mercury becomes liquid, but if the two metals be united in equal proportions the result is a solid alloy. If molten tin and mercury are brought together in the proportion of 3 parts of the latter to 1 of the former, the amalgam is obtained in cubic crystals. Tin amalgam has been largely used for silvering the backs of looking-glasses. The silvering of mirrors with plane surfaces consisted in applying a layer of tin-foil alloyed with mercury to the back of the glass. The workshop for executing the process is provided with several smooth tables of fine-grained freestone or marble, truly levelled, having round their contour a rising ledge, within which is a gutter or groove. These tables rest on an axis, so that they may be inclined at any desired angle. A sheet of tin-foil, a little longer than the glass to be covered, is carefully spread on the surface of a table, and over this a small quantity of mercury is spread, which penetrates and dissolves the foil. A greater quantity of mercury is now added, and the surface of the glass to be "silvered" is applied. The excess of mercury is run off from beneath by decanting the table, and after removal to another table the plate is, in course of time, made to assume a vertical position, when the amalgam has become fairly dry. About a month is required for the draining and finishing processes, though smaller glass objects only take from a fortnight to three weeks. The amalgam finally adhering to the glass contains about 1 part mercury to 4 of tin. The method of "silvering" concave and convex mirrors are modifications of this. Mirrors may also be made by precipitating silver on the glass. Small iron castings may be tinned by an amalgam process.

Lead-Amalgam.—The union of lead with mercury may be effected either by pounding lead filings with the fluid metal, or by mixing the lead with it in a molten state. A small percentage of lead improves mercury used for meteorological purposes.

Zinc-Amalgam.—Very brittle alloys are made by this union; 8 parts zinc to 1 of mercury being extremely brittle. Five parts mercury with 2 of zinc and 1 of tin forms a metal occasionally used for the rubbers of electric machines.

Gold-Amalgam.—The old method of fire-gilding was essentially based on the amalgamation of gold and mercury, the proportions being in accordance with the class of substance to be gilded. The amalgam may be prepared as follows:—The gold is placed in a crucible, and when turned slightly red the requisite quantity of mercury is added—a common mixture being 8 parts of mercury to 1 of gold, and the crucible is left on the fire until all the gold is dissolved. The amalgam of gold is applied to brass through the medium of pure nitric acid holding a little mercury in solution; 100 parts of mercury and 110 by weight of pure nitric acid are placed into a glass matrass. On the application of a gentle heat the mercury dissolves, with the disengagement of fumes of nitrous gas which are permitted to escape. This solution is diluted with about 25 times its weight of pure water and is ready for use. The gilder's brush is dipped into it and is drawn over a lump of the gold amalgam described, which is then applied to the surface of the brass. This process is repeated again and again, the surface is washed, and finally the work is put to the fire to volatilise the mercury. In gilding polished iron and steel, auriferous ether, prepared by a nearly neutral solution of gold in muriatic acid mixed with "sulphuric ether," is applied to brightly-polished steel or iron, when the ether flies off and the gold adheres; but this class of gilding is neither rich nor durable. Of course, the method of cold gilding is very different, an amalgam not being employed.

Silver-Amalgam.—This may be made by mixing finely-divided silver with mercury; a common process is to precipitate silver from its solution by copper, when the precious metal is obtained in a fine powdery condition, which is then mixed with mercury. Or, if 6 parts of a saturated solution of nitrate of silver with 2 parts of a saturated solution of mercury nitrate are mixed with an amalgam of silver and mercury, in the proportion of 1 part of the former to 7 of the latter, arborescent crystals of the amalgam are obtained. When the union is assisted by the aid of an electric battery amalgams very rich in silver are derived.

Many other amalgams may be obtained, such as union of mercury with bismuth, or cadmium, copper, magnesium, potassium, and sodium, but they are more useful as assisting metallurgical operations than as metals used in building or decoration.

In concluding this part relating to metallic alloys, it may be stated that no space has been devoted to many of the principal alloys of metals mentioned, for the simple reason they do not fall within our province. The student must not imagine, therefore, that the foregoing are in any sense representative of alloys as a whole as used in all industries. Thus we have said nothing concerning the valuable mixed metals produced with gold and silver as bases, except in so far as those substances may be of interest either historically, or as used at present in gilding and silvering. The same may be said with reference to alloys of platinum; whilst those of iron have only been dealt with in a general way for reasons explained in the first article of this series.

* Consult "Mineral Resources of the United States for 1892," pp. 252 *et seq.*

OBITUARY.

MR. J. W. TROUNSON.—We regret to announce the death of Mr. J. W. Trounson, F.R.I.B.A., which occurred suddenly at his residence in Clarence-street, Penzance, on the 8th inst. Mr. Trounson, who was the son of Mr. John Trounson, builder, of Penzance, had an extensive practice as an architect throughout West Cornwall, and had carried out some large works, including the mansion of Boskenna at St. Buryan, the additions to St. Peter's, Newlyn, the jubilee memorial extension of St. Paul's, Penzance, the new Wesleyan Chapel at Penryn, Pike's Hill Wesley School, Falmouth, the Bible Christian Schools, Heamoor, various board schools in Cornwall, Messrs. Chudleigh's premises at Johannesburg, and the recently-opened extension of the Penzance Wesleyan Day Schools. Mr. Trounson, who was forty-six years of age, leaves a widow and three children.

GENERAL BUILDING NEWS.

COUNTY COUNCIL BUILDINGS, STAFFORD.—The new County Council buildings have just been opened at Stafford. The buildings have been constructed from the designs of Mr. H. T. Hare, of London, superintended by his clerk of works, Mr. James Trill, Bow, E. The contractor was Mr. H. Lovatt, of Wolverhampton, and the building has been superintended by Mr. Wilson Lovatt, assisted by Mr. J. M. Tildesley. The carving in wood and stone has been executed by Mr. W. Aumonier, of London. The modelling and plaster enrichments are by Mr. F. E. E. Schenck, also of London; leaded lights by Messrs. Pearce; lifts by Waygood; ironwork construction and fireproof flooring by Messrs. Lindsay & Co., Westminster; and the entrance-gates and ironwork by Messrs. Starkie Gardner & Co., of London. The lavatories throughout have been fitted by Messrs. Shanks & Co., of London and Glasgow. The building was illustrated and described at some length in our issue for August 6, 1892.

ALL SAINTS' CHURCH, NORFOLK-SQUARE, W.—This church, which was destroyed by fire rather more than a year ago, was re-consecrated on the 1st inst. The old church was built of brick with Kentish rag facings, and had galleries. The fabric of the walls was fairly uninjured, but the whole of the wrought stone-work was destroyed. The old walls were in part retained, being coated externally with red brick. Entirely new arcades have been built, considerably further apart than the old, and the material for this and other dressings is terra-cotta. The roof is of Oregon pine and deal. The thrust of the wide trusses is taken by concrete pieces stretching across the aisles and on to new buttresses, the tops of which cover the concrete and serve as ventilation exits to flues left in the buttresses to ventilate the extensive basement. The slates are laid in concrete plaster, in the manner introduced by the architect. The passages and chancel are floored with mosaic by Messrs. Turpin. The stalls and seats to nave, which are of somewhat

Jacobean design, are of padouk, a hard and fine red wood from Burmah, and have been executed by Messrs. Norman & Burt, of Burgess Hill. The brass work is by Messrs. Thomason, of Birmingham. The font, which is not yet finished, is also of Jacobean design. The electric lighting has been carried out by Messrs. Sotheby to the architect's designs, and is effected by suspending from the roofs a number of single lights with glass shades. An organ has been erected by Messrs. Hill, the whole of the great organ being built out into the chancel. The principal feature of the outside is a terra-cotta porch at the west end with five gables covering three doorways and two recesses. The terra-cotta is by the Tamar and Coalville Company. The proposed terra-cotta belfry-stage and spire has still to be carried out, as well as a carved oak canopy over the altar. At the east end of south aisle a morning chapel has been arranged on the site of the old gallery stairs. The contractors are Messrs. Perry & Co., of Bow, and the architect Mr. Ralph Nevill, F.S.A., of London.

MARKET, SWANSEA.—The foundation-stone of the new Swansea Market has just been laid. The architects for the work are Messrs. J. Buckley Wilson & Glendinning Moxham. The plans for the new market were selected in open competition. The area to be covered is about two-and-a-half acres, the frontage to Oxford-street being 416 ft. This will be built of red Ruabon bricks with Bath stone dressings. The principal entrance will be opposite Portland-street, with towers on each side rising to a height of 60 ft. There are two minor entrances in Oxford-street and one in Union-street. There are to be eighty butchers' stalls, which are arranged round the market, and the main entrance is 60 ft. wide. The construction will be chiefly of iron, the top portion being glazed with patent bars. The floor will be covered with patent granolithic paving. The main roadway from Portland-street to Orange-street will be pitched with native stone setts. The contractors are Messrs. Bennett Bros., Swansea.

CATHOLIC CHURCH, BIRMINGHAM.—The new Catholic Church of St. Patrick in Dudley-road, Birmingham, was formally opened on the 29th ult. The west front consists of a deeply-recessed west entrance with a gable over, surmounted by a niche containing a statue of St. Patrick, between two large two-light windows. On the south side is a small tower containing the Angelus bell, the gift of Admiral Tinklar. On the north is the baptistry treated with an apsidal end, and in which is an alabaster font. The nave is divided into five bays. To the north of the chancel is situated the Lady Chapel, and on the other side that of St. Joseph, with archways between the chancel and chapels. There are three confessionals, one on the north and two on the south side, also sacristies for the use of the priests and choir. The nave roof is of timber (pitch-pine), and the aisle roofs are carried on internal flying buttresses in place of principals. In the centre is a ventilating turret, with openings into a large flue communicating with it. The materials used are red bricks with red stone dressings, and tile roofs; and internally, red stone arches and columns, with plaster walls. The style of the church is French Gothic of the twelfth century. The cost has been about 5,000*l.*, and the whole of the work has been carried out from the designs and under the superintendence of the architects, Messrs. Dempster & Heaton, of Birmingham, by Mr. John Bowen, contractor, of Birmingham. The wrought-iron gas-fittings and communion rails are by Messrs. Hardman, Powell & Co. The heating, which is by radiators, is by Mr. Henry Hope; the other wrought-iron work being by Messrs. F. T. & A. Barratt & Co. and Messrs. Thomas Brawn & Co.

RESTORATION OF CLUNGUNFORD PARISH CHURCH, SALOP.—The re-opening of Clungunford Parish Church after restoration has recently taken place. Until its restoration the fabric consisted of an unusually large chancel, an aisle, and a chantry, with an oak roof, on the north side. It had a small bell-cot, containing three bells, which date from about the reign of Edward I., each having a Latin inscription, and severally dedicated to St. John, St. Gabriel, and St. Cuthbert. Since the restoration began a stone tower has been built on the north side containing the heating apparatus, a choir vestry, and a chamber in which to ring the bells. A porch has been added on the south side, with a carved figure of St. Cuthbert, the patron saint, standing in a niche over the entrance. The chantry is now converted into an organ-chamber and a priest's vestry. The restoration of the church was commenced in September, 1894, the architect being Mr. Edward Turner, Leicester. The contractors who have carried out the work are Messrs. Smith & Sons, Woolverley, near Kidderminster.

BOARD SCHOOL AT SAXMUNDHAM.—A board school has beeu opened at Saxmundham. The building forms three sides of a quadrangle, and consists of three rooms, comprising a large school, an infant school, and a class-room 60 ft., 40 ft., and 30 ft. respectively in length, with a uniform width of 22 ft. The quadrangle itself constitutes a sheltered playground, the open side of which faces south. On the west and east are the entrances, with cloak-rooms and lavatories attached. The building is carried out with red-facing bricks, with semi-circular window-heads of cut and rubbed red bricks. The roofs throughout are covered with Broseley tiles. The corridors and cloak-rooms are paved with red Staffordshire tiles. The lavatory walls are built of white-glazed and salt-glazed bricks. The plaster of internal walls is everywhere protected by a wood dado 4 ft. high. The school-bell is hung in a turret, with lead canopy and spire, on the roof of the large room. The architect is Mr. T. E. Key, of London and Aldeburgh, and the contractor, Mr. W. Ingram Smith, of Woodbridge.

PARISH CHURCH, SKELMORLIE, N.B.—The new Parish Church of Skelmorlie has recently been opened. The new church has been erected from plans prepared by Messrs. John Honeyman & Keppie, Glasgow. The estimated cost of the building was over 5,000*l.*, and many additions and improvements have been added since the building operations began. The old church was of a cruciform plan, and the transepts had to be taken down to make room for the new building. The old nave is to be used in future as a hall for Sunday-school and other congregational purposes. From this nave the new church extends in a south-easterly direction, and a massive tower with a short spire rises between the new and the old buildings. The dimensions of the church are 72 ft. by 43 ft., the chancel being 25 ft. by 15 ft. The plan is a nave with one side aisle separated from the nave by five arches; a chancel; and an organ-chamber with openings towards the chancel and the side aisle. The arcading between the nave and the aisle, the chancel arch, the end and side windows, with their rear arches, are all built with the warm-tinted stone of the locality; and in the chancel, clustered shafts, mouldings, and dog-tooth ornament are freely introduced. The roofs are all of dressed timber. The steps at the chancel arch are of Skelmorlie stone, and a third step in front of the communion-table is of marble. The large three-light window in the gable of the chancel is filled with stained glass, the subjects being chosen from the life of Christ. In the central lancet there is the figure of the ascending Christ, while in the side windows the subjects are the Baptism and the Passion of the Redeemer. A feature of the chancel is the small three-light window in the side wall. The stonework of these side windows is finely-wrought, the windows being occupied by three stained-glass figures of notable Scottish saints—St. Ninian, St. Columba, and St. Kentigern. These windows are the gift of Mr. John Honeyman, one of the architects of the church. The glass has been executed by Messrs. J. & W. Guthrie, Glasgow. The vestry is placed at the south-east corner of the building, where there is a door of egress. The principal entrance is at the north end and in the base of the tower. The outer doorway is very deeply recessed, and the porch is lined with ashlar and paved with tiles. From this there is communication with the remaining portion of the old church, the old vestry, and the session-house, which is on the first floor of the tower. The builder was Mr. W. W. Oswald, Skelmorlie.

NORTH STAFFORDSHIRE ASYLUM, CHEDDLETON.—The foundation-stone of the new County Lunatic Asylum, which is to be erected at Cheddleton, near Leek, has just been laid by Lord Wrottesley. The site at Cheddleton was adopted by the County Council in 1892, and the Lunacy Committee were authorised to obtain plans and estimates for the new asylum. Subsequently premiums were offered for designs, and Mr. C. H. Howell, Consulting Architect to the Commissioners in Lunacy, was appointed professional assessor and adviser in the competition. The result was the adoption of the plans and designs of Messrs. John Giles & Gough, of London, who were appointed architects to the building. The buildings are required to accommodate 600 patients—viz., 300 males and 300 females. The designs afford facilities for future additions to accommodate 800 patients without going beyond the limits of the site, with the requisite administrative offices for the latter number. The buildings will have a south-west aspect, and will occupy a position more than 500 ft. above sea-level. The design includes, in addition to the main buildings and offices, a chapel for 450 patients, superintendent's house, large recreation and dining-hall, with stage arrangements, two lodges, laundry, farm buildings, workshops, infectious diseases hospital, mortuary, and airing courts. No boundary-walls are required round the whole estate, but the airing courts are to be enclosed in such a way as not to obstruct the view. Provision is also made for warming, ventilating, cooking, and washing appliances and machinery, the water service, storage of rain-water, formation of roads, &c. All proper precautions will be made to prevent dampness internally, for the prevention of fire, and to provide adequate means of escape in the case of fire. The infectious diseases hospital will provide for twelve beds, and will be placed 300 yds. distant from the main buildings, on the highest point of the site. The mortuary will also be completely detached from the main buildings. As the result of boring, a flow of water has been obtained on the asylum land. It has been decided to sink a permanent well of seven feet diameter to a depth of 110 ft., and the yield has been proved to be approximately 70,000 gallons a day. From this well the water will be pumped to a tower 100 ft. high, with reservoir holding 35,000 gallons. The buildings will cover an area of about eight acres. The bricks which are being used in the building are obtained in the locality from the Wall Grange Brick Company, and the red sandstone dressings are from the Beggar's Wall quarries, near Alton. The common bricks for interior work are supplied by Mr. H. Warrington, of Berry Hill. The builders are Messrs. W. Brown & Son, of Salford. The clerk of works is Mr. H. Pebworth.

LIBERAL CLUB, YEOVIL.—A new liberal club has just been opened in Middle-street, Yeovil. The front of the building is of Ham Hill stone. The entrance is approached by a couple of steps of Keinton stone. The entrance-hall is laid with tesselated tiles. On the right-hand side is a large room for the Women's Liberal Club. On the opposite side of the hall is a men's reading-room. The library will be at the end of the entrance-hall, on the right-hand side; and the assembly-hall at the rear. Leading out of the lobby at the top of the staircase is the billiard-room. Adjoining is a large committee-room. The architects were Messrs. C. & C. B. Benson, of Yeovil, and the builder, Mr. Wallbridge.

RENOVATION OF TOWN HALL, COWBRIDGE, GLAMORGANSHIRE.—Cowbridge Town Hall has just been re-opened after renovations. Mr. C. B. Fowler, of Cardiff, was the architect, and Mr. Alfred Jones, of Cowbridge, the contractor. The hall will now seat about 100 more than before the alteration was made. On the ground floor there is a suite of rooms, and in the front is a new council-chamber, which will also be used as a police-court. Next to that is the mayor's parlour. There are cloak-rooms and lavatories, and two greenrooms for use in the case of entertainments.

THE CHURCH OF ST. MARIE REPARATRICE, CORK.—This church has just been dedicated. It has been built by Messrs. E. & P. O'Flynn, from designs by Mr. S. F. Hayes, architect. The high altar is of Gothic design, in keeping with the character of the church. Beneath the altar-table is a group representing the Nativity of Our Lord, terminating with a cluster of four pillars. Outside this, and finishing the line of reredos, are double credence stands supported by marble pillars. The reredos, which rises to a considerable height, is subdivided into four panels, containing carved and perforated inner panels bearing emblems of the Passion. The upper part of the reredos is panelled, gables being introduced for each of the arches. The throne or canopy is octagonal in form, terminating with a Celtic cross. Irish marble is introduced into the altar wherever possible. The architect of the altar is Mr. E. L. M'Donnell, Dublin, and the contractor Mr. W. P. O'Neill, Dublin.

SCHOOLS, BILSTON.—The memorial-stones have just been laid in connexion with additions to St. Luke's Schools, Bilston. The schools at present hold about 300 children, and as a result of the improvement works now on hand, and which will cost some 1,300*l.*, the accommodation will be so extended as to admit altogether about 475 children. The builder is Mr. H. Cave, of Wolverhampton, and the architect, Mr. R. J. Rowe, of Bilston.

NEW WORKHOUSE INFIRMARY, OTTERSHAW, SURREY.—A new infirmary has just been erected by the Chertsey Union Board of Guardians at Ottershaw. The work has been carried out by Mr. R. J. Hunt, of Chertsey, from the designs of Mr. C. Welch, architect.

RESTORATION OF SPAXTON CHURCH, SOMERSETSHIRE.—The parish church of Spaxton, near Bridgwater, dedicated to St. Margaret, has recently undergone restoration. The length of the church internally, from the west wall of the tower to the east wall of the chancel, is about 92 ft., and the width, from the north wall of the nave to the south wall of the aisle, about 33 ft. The oak bench-ends throughout the nave and aisle are richly carved. The dates 1536 and 1561 are cut upon two of them. The only structural alteration has been the erection of an organ-chamber with a vault for a heating apparatus under it. This has been effected by pulling down the west wall of the vestry and extending the vestry so as to give room for the organ to the westward, an arch being formed in the north wall of the chancel to receive the front of the organ. In order to insert this arch it was necessary to remove one of the ancient windows, which has been built in again in the north wall of the chamber, opposite its former position. The organ, which lately stood at the east end of the south aisle, blocking a window, has been remodelled and placed in the new chamber by Mr. W. G. Vowles, of Bristol, with a front projecting into the chancel, through the new arch. In the chancel has been laid a new floor of Maw's tiles. An embossed tile reredos by Maw has been placed against the east wall and the tiles returned as far as the marble step in the north and south walls. The centre piece contains the Apha and Omega, on a ground of mosaic, arranged on either side of an equal armed St. Andrew's Cross, in red marble. The two tables of the Commandments have been refixed over the reredos at a higher level than they occupied formerly. The oak stalls and prayer-desks are entirely new, with fronts of open tracery. The floor of the seats is of wood blocks. Within the rail to the south of the Lord's table is a credence-table. In the nave, south aisle, and chancel aisles the stone floors have been taken up and relaid on concrete, the memorial slabs replaced, and new paving-stone provided where necessary. In the chancel-aisle a rearrangement of the old seats was rendered necessary after the removal of the organ. The pulpit has been lowered, and a new flight of oak steps and a rail,

supported by wrought-iron standards, added. All the windows, none of which contained any remains of ancient glass, have been filled with tinted glass in new leadwork. The waggon-headed roofs of the south aisle and chancel-aisle are divided into panels by moulded ribs with carved bosses at the intersections. Some of the bosses were wanting, and these have been supplied. The plastered surfaces throughout the church have been cleaned and recoloured. The old stove and pipe smoke-flue having been removed, the church is now warmed by a system of hot-water pipes, arranged by Messrs. Skinner & Board, of Bristol. The contractor is Mr. H. W. Pollard, of Bridgwater; the glazing was prepared by Messrs. J. Bell & Sons, Bristol; Mr. W. G. Giles, of Wellington, performed the carving; and Mr. West, the village smith, made the hinges for the doors and the iron standards supporting the choristers' desk and pulpit-rail; Messrs. A. W. Blackler & Son, of Torquay, supplied the Devonshire marble. The work generally has been cerried out from the plans and under the personal superintendence of Mr. J. Houghton Spencer, architect, of Taunton.

CHAPEL, PORTMADOC, NORTH WALES.—A new English Presbyterian Chapel and School is to be erected at Portmadoc, from the designs of Mr. T. Taliesin Rees, of Birkenhead. The chapel will accommodate 300 persons, with provision for future gallery. The schoolroom is to seat 150, at the rear of which are kitchen, minister's vestry, heating-chamber, water-closets, &c. The design is in decorated Gothic style. The walls are to be built of local stone, with red Runcorn stone dressings and tracery, the internal work will be finished in selected pitch-pine. The contractor is Mr. John Shaw, of Birkenhead.

PREMISES, TOTTENHAM COURT-ROAD.—Messrs. Jas. Shoolbred & Co. are rebuilding that portion of their premises which stand at the corner of Grafton-street and Tottenham Court-road, from the designs of Messrs. Hovenden & Barber. Messrs. Holland & Hannen are the contractors, and the floors are to be fireproof on the "Mark Fawcett" system.

NEW PARISH-ROOM AND CLERGY VESTRY, ST. MICHAEL'S, IPSWICH.—A new parish-room and clergy vestry were opened at Ipswich recently by the Bishop of Thetford. The buildings join up to the present church at the south-east end, and consist of a parish-room 39 ft. square, with scullery attached and entrances with vestibules from Bond-street and Upper Orwell-street, and a clergy vestry with door from same into chancel. The style of architecture is a simple form of Queen Anne. The cost has been about 1,200*l*. Mr. E. F. Bisshopp was the architect, and Mr. William Grayston the builder.

NEW ALMSHOUSES, WETHERSFIELD, ESSEX.—These almshouses have just been completed, and were erected at the sole expense of Mr. Arthur Henry Gower, of Ipswich, as a memorial to his parents who, many years ago, resided at Wethersfield Hall. Mr. Gower has also provided an endowment fund for the future maintenance of the fabric. The range consists of four houses, raised on a terrace, each having a living-room, scullery, and other conveniences with verandah both back and front. The style is Elizabethan, harmonising with the ancient architecture of this interesting old village. The cost has been about 1,000*l*. Mr. E. F. Bisshopp, of Ipswich, was the architect, and the builder was Mr. Alfred Brown, of Braintree.

METHODIST CHURCH, NEWQUAY, CORNWALL.—Corner-stones of the new building in course of construction for Claremont Free Methodist Church, Newquay, have just been laid. The building will be constructed of Cornish granite and Plymouth limestone. The style adopted is of Gothic character. The dimensions of the building internally are—length, 56 ft.; width, 36 ft., in addition to which there is an organ-chamber 22 ft. by 8 ft. 6 in. on the north side, which will be divided from the chapel by double arches. At the rear there will be minister's and choir vestries, with lobbies to each, communicating with the chapel, the slope of the ground admitting of a basement being placed under the vestries for stores, &c. Accommodation will be provided for 400 worshippers on the ground floor, and in an end gallery over the front entrance, vestibule, and lobbies. On the left hand of the main entrance will be a cloakroom, and on the right a staircase leading to the gallery. The roof is to be partially open, having wrought and pierced wooden principals resting on stone corbels, with wrought purlins and iron tie-rods. The whole of the fittings will be in pitch-pine. The main front windows will have cusped and traceried heads, filled with leaded lights of geometrical design, the sides and vestry windows to be filled with enamelled glass. The architect is Mr. J. Ennor, jun., of Newquay, and the builder, Mr. John Colliver, of Truro.

ST. MARTIN'S CHURCH, EXMINSTER.—On the 11th inst. the ancient church of St. Martin, Exminster, was reopened after undergoing renovation. The building is of red stone, and in the Perpendicular style. It consists of a chancel, nave, south aisle and south porch, and an embattled western tower, containing a clock and six bells. The roofs having been found to have become so unsound as to render some steps necessary to be taken before another winter, Messrs. Rowell & Son, architects, of Newton Abbot, were instructed to inspect the roofs, and to report to the Committee; and, after making a thorough examination, they recommended that the slating should be entirely removed and the timbers laid bare, and if they proved not to be in too decayed and defective a state that they should be repaired and strengthened, or that, if necessary, an entirely new roof of oak should be substituted. The Committee decided to adopt the former course. The old timbers have been repaired and strengthened, covered with new slating on the outside, and a plastered barrel ceiling placed between the moulded ribs on the inside. New iron shuting and rain-water descending pipes have also been provided. In the interior, the western galleries have been removed, and the tower arch and western window have been opened to view. The font, erected in 1843, has been mounted on a new base, and placed in the tower. The former pews have been replaced with oak seats, and the floors under them laid with wood blocks. The aisles have been relaid with the paving stones removed from the former aisles. The whole of the works have been carried out by Mr. Herbert Read, of Exeter, under the direction of the architects, Messrs. Rowell & Son.

CHURCH, CARLTON MINIOTT, YORKSHIRE.—The foundation-stone of the new church at Carlton Miniott (Thirsk) was laid on the 9th inst. The new edifice is to occupy the site of the ancient Parish Church, which for many years has been in a state of decay. The architect is Mr. Hodgson Fowler, of Durham, and the contractor Mr. Harwood, of Marfield, Darlington. The cost of rebuilding, furnishing, &c., of the church is estimated at 1,200*l*.

CHURCH OF ST. NICHOLAS', KELVEDON HATCH, ESSEX.—The new church and churchyard of St. Nicholas, Kelvedon Hatch, were consecrated by the Bishop of Colchester recently. The church, which is in the Early English style, is built of red brick, with a red-tiled roof, while above the entrance porch rises an oak spire, surmounted by a weather-cock, and containing the bell which was in the belfry of the old church. The new church has been built on a site which covers an acre. The old Parish Church is situated about a mile and a half from the village. The church will accommodate nearly 250 persons. The roof is of oak, and the flooring is of wood blocks, the seating being carried out with the benches from the old church. The artificial lighting is by means of brass oil lamps hanging from the ceiling, and the heating is carried out by hot air. The font from the old church has been removed to the new building by Mr. T. W. Haws, of Brentwood. The architect of the new building is Mr. J. T. Newman, of Kelvedon Hatch. The church was erected by Mr. John Gozzett, of Maldon.

RECONSTRUCTION OF STRANRAER ACADEMY, WIGTOWN.—This building has been reopened after reconstruction. The building was gutted by fire almost a year ago, and soon afterwards the work of reconstruction was proceeded with. The architect was Mr. James Caird Macfarlane, Stranraer.

THE BIRMINGHAM AND MIDLAND EYE HOSPITAL.—On the 9th inst. the Viscountess Newport performed the ceremony of declaring the new wing of this building to be open and ready for occupation. The work which is now completed is an important addition to the hospital, which was removed to the present site at the corner of Church and Edmund-streets into a new building erected for its accommodation in 1884, a description of which was given in the *Builder* in vol. xliii. page 91. Hitherto the children admitted into the hospital have been placed in the female side of the building, but this having been found objectionable both from a medical point of view, and that of comfort to the patients, it was decided to erect a separate department for children. The new work consists of an extension of the Edmund-street frontage carried out in conformity with the original design. The accommodation consists of wards for thirty children, a day room, ward kitchen, linen room, bath room, lavatories, &c., all upon one floor level, bedrooms for most of the staff of the whole institution, enlargement of the out-patients' department, and improved accommodation in the male wards; the two lower floors of the new buildings (at present let off as professional offices) being reserved for future accommodation. The work has been carried out at a cost of about 5,000*l*. by Messrs. J. Harley & Son, contractors, of Smethwick, from the designs of Mr. Henry F. Talbot, architect, of Birmingham, who, in conjunction with the late Mr. E. J. Payne, was architect of the main building in 1884.

UNDERGROUND CONVENIENCE, COLCHESTER.—An underground lavatory and convenience has just been constructed in Colchester near the Town Hall, at a cost of 320*l*. The walls are constructed of concrete 15 in. thick, faced with glazed bricks supplied by the Farnley Ironworks Co. The floor is paved with black and red Minton tiles, and the steps are of concrete, with Doulton's silicon treads. The whole of the roof is utilised for light and ventilation, Messrs. Hyatt & Co. supplying the pavement lights and grates. The water-closet, urinal, and lavatory fittings were supplied by Messrs. Doulton & Co. The urinals are circular in section, with white glazed stoneware backs, and the closets are wash down, of the "Simplicitas" pattern. The accommodation consists of five urinal stalls, two water-closets, a lavatory, and a room for the attendant. Mr. H. Goodyear, Borough Surveyor, was the engineer, and Mr. Beaumont of Colchester the contractor.

SANITARY AND ENGINEERING NEWS

SEWERAGE WORKS, GODALMING.—These were formally opened on the 4th inst. by the Mayor, Mr. W. R. Pullman. The outfall works are situated at Unstead, about one mile outside the borough, the sewage being conveyed thence in a cast-iron sewer 21 in. diameter. From the receiving well it is pumped through a rising main to the precipitation tanks. The two sets of pumping-engines are of the Worthington triple expansion type, erected by Messrs. J. Simpson & Co. of Pimlico. The tanks are three in number and the sewage, being chemically treated after passing through them and through coke filters, is taken on to specially-prepared land about thirteen acres in extent. The scheme also includes the whole of the sewers and branch drains inside the borough. The engineers are—for outfall works and northern section of sewers, Mr. Henry Moon, Godalming. For the southern section, Mr. S. Welman, Borough Surveyor. The whole of the works have been carried out by Mr. W. Cunliffe of Kingston-on-Thames at a cost of 36,000*l*.

NEW PUMPING MACHINERY, HEREFORD WATERWORKS.—New pumping-engines have recently been erected under the management of the Waterworks Committee of the Hereford Corporation. The following particulars are taken from a short report read by the City Surveyor on the occasion of the starting of the engines (which was formally done by the Mayor of Hereford):—The question of improved pumping appliances at the Waterworks pumping-station has long engaged the attention of the Waterworks Committee, and on February 13 last year the City Surveyor reported that the old engines were unreliable and very extravagant in the use of fuel, and costly in repairs. The Committee being desirous of obtaining the best possible plant with the least expenditure, and having obtained tenders, deputed a Sub-Committee to visit the works of the Hartlepool and West Middlesex Companies at West Hartlepool and Hammersmith, where engines and pumps were in operation constructed by the firms whose tenders were lowest. This the Sub-Committee did on May 25 and 26 of last year, and unanimously recommended that the tender of Messrs. Worth & Mackenzie be accepted, subject to the approval of the Council and the Local Government Board. A Local Government inquiry was held before Colonel Luard on September 28, 1894, when the scheme was recommended for approval, and the sanction of the Local Government Board was subsequently obtained for borrowing powers of 3,800*l*. for this purpose. Messrs. Worth & Mackenzie's tender was then formally accepted for the engines, &c., and that of Messrs. Bowers & Co. for the buildings, &c., in accordance with the following description:—The engine is of the triple-expansion condensing type, direct acting with overhead marine pattern cylinders 13½ in., 21¼ in., and 36 in. diameter by 30 in. stroke, driving three single acting ram pumps 16 in. diameter lifting 100,000 gals. per hour. The engine-house, erected by Messrs. Bowers & Co., is arranged to correspond with the existing buildings, and the floor is depressed 1 ft. 3 in. below the old engine-house floor, in order to reduce the suction as far as possible. All special pipes and valves are so arranged as to provide for future extensions, if or when required. Two valves with standards and hand-wheels with 2 6-in. self-acting reflux valves, in one operation regulate the supply to the tower or storage reservoir without stopping the engine. The method of operating these valves (which may be distinguished as A A′ and B B′) is as follows:—Suppose valve A to be shut and valve B open, the high lift pumps are then pumping river water from the well into the storage reservoir through valves marked B and A′, which open automatically, valve B′ being at the same time automatically closed owing to the pressure from the water-tower being so much greater than the pressure in the 14 in. main. When it is required to pump water to the tower, valve A is opened and the pressure of water from the clear water reservoir automatically closes valve A′. The engine-man then closes valve B and the pressure of water from the high-lift pumps at once opens the reflux valve B′, when the pumps commence delivering clean water to the tower. It takes the man about one minute to close valve B, during which time the engine will have made about twenty-five strokes, pumping filtered water through valve B into the 14 in. main, thus thoroughly washing out all river water from the 6 in. pipes before the pump commences delivery to the tower. This arrangement is much better than that of disconnecting the high-lift pumps, which would have rendered a stoppage of the engines necessary each time the tank on the tower was filled. The duty performed by the old h.-p. pump is performed in an economical manner by a pair of high-lift pumps attached to the intermediate engine, capable of delivering 15,000 gallons per hour, either to the tower or reservoir at pleasure. It should be added that the works have been completed within the estimate.

NEW WATERWORKS, LAUNCESTON.—New waterworks were opened at Launceston by the Mayoress (Mrs. John Kittow) on the 31st ult. From the source at Carne Down to the reservoir there is fall of 203 ft. Of circular form, the reservoir itself will contain 350,000 gallons, equal to about three days' supply. It has been constructed of clay puddle, both at the bottom and sides, with a con-

crete lining coated with cement. It is 360 ft. above St. Thomas's Bridge, the lowest part of the town. At the reservoir a pressure reducer has been fitted, but a by-pass has been constructed, enabling the water, if necessary, to pass direct from the source into the town. The reservoir is protected by an outer wall of granite, with stone coping and iron railings, and an inner dwarf wall, with ornamental railings. The space between the two walls will be laid out with flower-beds. The contract for the service reservoir has been carried out by Mr. R. G. Burt, Launceston, for 1,360*l.*, and the construction of the intake works and the laying of the pipes by Mr. Joseph Fisher, of Millbrook, for 295*l.* and 1,250*l.* respectively. The pipes were supplied by Shaw & McInnes, of Glasgow, the amount of their contract being 3,678*l.*, and the valves by Blakeborough, of Brigg House, Yorkshire. Mr. McOwen has discharged the duties of clerk of the works. Including the acquisition of the water-rights and easements, and the purchase of the wind-mill, the total cost of the work has been about 10,500*l.* Mr. S. Jenkins, of Liskeard, was the engineer of the works.

THE GORTON SEWAGE WORKS.—To mark the completion of the Gorton sewage scheme, a ceremony took place on the 6th inst., at which Dr. B. W. McArthur (Chairman of the Gorton Urban District Council) set the works in operation. A gold key, the gift of Mr. F. Candy, managing director of the International Water and Sewage Purification Company, was presented to Dr. McArthur by Mr. R. T. Holland, Clerk to the Council. Before the adoption of the scheme the whole of the sewage of the township went into Gorton Brook and Gore Brook without having received any treatment at all. The Mersey and Irwell Joint Committee, however, served the Council with a notice requiring them to divert the whole of their sewage from the streams within a given time. A scheme was, therefore, prepared dealing with the entire township, and consisting of main concentrating and several tributary sewers. Application was then made to the Local Government Board for sanction to borrow the necessary money, which was estimated in round figures (and including the cost of the land) at about 40,000*l.* An inquiry was held at which opposition to the scheme was made by the Manchester Corporation on the ground that the effluent would drain into a stream (the Gore Brook) that flowed through the city. The Local Government Board, however, gave its approval to the plan, and sanctioned the loan which its adoption involved. A convenient plot of ground was secured near to Belle Vue Gardens, and the first sod was cut in 1893. The engineers have been Messrs. Lomax & Lomax, of Manchester, and under their direction the work has been carried out by Mr. Daniel Eadie, of Stockport. There are two detritus tanks with a capacity of 110,000 gallons, and three large precipitating tanks with a combined capacity of 1,079,000 gallons. The sewage, on entering the works, passes into the two detritus tanks, having first received a dose of ferozone sufficient to effect a complete precipitation of the heavier suspended matter. From these it flows into three precipitation tanks, where the lighter suspended matter is deposited. The sewage, having been clarified, is conveyed to six polarite filter-beds of a superficial area of 2,663 square yds. The whole scheme is designed to meet the requirements of a future prospective population, and it possesses a convenience, said to be unique, in that the tanks and filter-beds are able to deal not only with the sewage, but also with a half-inch of rainfall over the entire area built upon. It is intended in future to deal with the sludge deposited in tanks by means of filter-presses, but this is not yet included in the scheme. The outfall works have cost 17,000*l.*, and the concentrating sewers have involved an expenditure of 8,000*l.* more. Other important sewers are about to be carried out, and when completed the whole of the sewage from the township will be conveyed to the Outfall Purification Works, and the pollution of the rivers, so far as Gorton is concerned, will be at an end.

PUBLIC IMPROVEMENTS, COLWYN BAY.—On the 6th inst. Col. W. L. Coke, J.P., D.L., M.Inst.C.E., held an inquiry, on behalf of the Local Government Board, into the Colwyn Bay and Colwyn Urban District Council's application to borrow a sum of 12,000*l.* for the construction of a promenade on the foreshore; 677*l.* for works of sewerage, and 384*l.* for works of street improvement. There were present amongst others, Mr. Jas. Porter (Clerk to the Council) and the Surveyor (Mr. Wm. Jones, A.M.Inst.C.E.). The Surveyor said that the portion of the foreshore now taken over by the Council would all be covered by the proposed works. The length of the promenade would be 1,452 yards, and it would extend, from about the middle of the station premises, to a point beyond the public path which at present ran to the main road at the Marine Hotel. The maximum width of the promenade would be 125 ft. The promenade proper up to that point, would include a road and a footpath. The minimum width of the promenade would be 65 ft. They intended to build a sea-wall along the outer face of the promenade of an average depth of 9 ft. from the coping to the bottom of the footing. That included the coping. That wall would be built of limestone in cement, backed to its full thickness with concrete. The average thickness would be 3 ft. 3 in. The latter on the face would be one in four. That wall would have shingle for its foundation. They had at present on the shingle a wall which had stood for the last five years against very severe gales. Every yard of that wall weighed between 35 and 40 tons, so that he thought that that was sufficient evidence as to the stability of the foundation. The depth of that wall was only about 5 ft. below the surface, while the new wall in front would go down about 5 ft. deeper still. The greatest scour that he had ever seen on the beach was about 3 ft., but he should inform the Inspector that this was brought back again, so that there was a continual process of scouring and filling going on on the beach. They would continue the promenade from one end of the wall to the other. They would have a kerb and channel on each side of the road. The surface of the promenade would be covered with a 5-in. layer of tar-paving, and the road would be pitched and macadamised. The average height of the coping of the wall would be 2 ft. 4 in. above the foreshore. For the convenience of bathing-machines, bath-chairs, and horses, that it was desired to take down to the sands, he had provided slopes every hundred yards, 5 yards wide, with a slope of 1 in 25 down to the shore. He proposed paving these slopes with setts. Two additional approach-roads would be made—one in the middle, and one at the end—and it was the intention of the Council to extend the Promenade both eastwards and westwards. The Inspector visited the site of the proposed promenade, and the inquiry terminated.

WATER-SUPPLY, BAMFORD, DERBYSHIRE.—The Parish Council of Bamford have agreed upon the adoption of a scheme prepared by Messrs. Sterling & Swann, whereby the whole of the village will be supplied with water.

STAINED GLASS AND DECORATION.

WINDOWS, ST. AIDAN'S CHURCH, LEEDS.—Two stained-glass windows have recently been added to this church. They are the west window of the baptistry and the west window of the morning chapel. The former represents the three phases of Baptism, the latter "two of Our Lord's appearances after the Resurrection." They are executed by Messrs. Percy Bacon & Bros., of London.

ENCAUSTIC TILE FLOOR, CLEVEDEN HOUSE.—The *Pottery Gazette* gives a description of a tile floor executed by Messrs. Minton, Hollins & Co. for Mr. Astor, the present owner of Cleveden. The floor is 25 ft. 8 in. by 23 ft. 8 in., and has been specially designed for the situation. On the outer border are figures of Cupids, white on a jasper blue ground, holding wreaths the ends of which are attached to a vase in the form of a fountain. At the top of the columns or plinths in the centre of the floor are allegorical figures in white upon a jasper ground, the figures being relieved by touches of green. The Elements are represented by four allegorical pictures, and in the centre of the pavement the mask of Medusa is portrayed. The colours of the tiles used are blue, white, grey, buffs, black, green, and purple.

SCULPTURE FOR ASSURANCE OFFICES, CALCUTTA.—Messrs. Harry Hems & Sons, of Exeter, have just completed some colossal pieces of sculpture, weighing in all about thirty tons, which are to be placed on the main front of the new Standard Assurance Offices in Dalhousie-square, Calcutta. They consist of allegorical statues representing "Life" and "Death." Besides these, there is a pediment 30 ft. long with ten females figures therein, each 6 ft. 6 in. high, sculptured in the round. They represent the five wise and five foolish Virgins, and are destined for the main gable of the new edifice. There is also a statue of "Atlas," which stands 9 ft. high. The architect for the new building at Calcutta is Mr. Frederick W. Stevens, Companion of the Indian Empire.

FOREIGN AND COLONIAL.

FRANCE.—The artistic jury of the International Exhibition has just given their decision on the open competition for the execution of a diploma. The first prize has been awarded to M. Roedel; the second to M. Dillon.——M. Falguière has just finished a magnificent bust of Renan, which the State commissioned him to execute for the College de France.——The Committee on the Victor Hugo monument has given the execution of it into the hands of the sculptor Ernest Barrias. It will be placed on the "rond-point" of Place Victor Hugo, and will represent the poet, in modern dress leaning on a rock. At the four corners of the monument, which will be in granite and bronze, there will be symbolical figures, of Epic poetry, Lyric poetry, the Drama, and Satire.——The Municipal Administration of Paris intend to cover the Canal Saint Martin, which at present is open from the Place de la Ville to the Boulevard Richard Lenoir. The top of the canal arch will be laid out with grass-plots, flower-beds and fountains.——A competition will shortly be opened for the building of a Conservatoire of Music and an Ecole des Beaux-Arts at Lille (Nord.).——The town of Beaune has commissioned the execution of the monument which it proposes to raise to the memory of President Carnot, to the sculptor Loiseau-Bailly, and the architect Deschamps. This monument, which is to be eight metrès high, consists of a pyramid supporting the bust of Carnot, above which is a winged figure of Immortality. On the stand is a figure engraving a funeral inscription.——M. Aïras, architect at Angers, has obtained a gold medal for the building of the National Exhibition which is to be held in this town. Gold medals have also been awarded to the architects Mongenot (of Epinal) Le Chatelier (of Paris) and Maillard (of Angers).——The Government have just sanctioned the making of a line from Etampes to Beaune-la-Rolande by Pithiviers. The expense is estimated at 9,076,000 francs.——The sculptor Cordonnier has just finished the monument of the singer Gustav Nadaud, which is to be erected at Roubaix in a few months. It consists of a stèle, surmounted by a bust. Two figures representing Song and Poetry lean towards him. There are two bas-reliefs representing two favourite songs, "Les Vendanges" and "Les Gendarmes."

MISCELLANEOUS.

CARDIFF COUNTY COUNCIL ELECTION.—Mr. Fred. J. Veall, of the firm of Veall & Sant, architects, Cardiff, was on the 1st inst. elected to the Council of the County-borough of Cardiff, for the Riverside Ward, polling the largest number of votes ever recorded for any candidate in that ward. Improved sanitation and better building inspection were the two strongest points upon which Mr. Veall insisted in his address and at his public meetings.

THAMES FLOODS PREVENTION.—A meeting of the Thames Floods Prevention Committee was held at the Windsor Guildhall on the 7th inst. for the purpose of protesting against the inaction of the Thames Conservancy with reference to the measures suggested for averting or minimising the inundations which are periodically experienced in the district.—Mr. H. Webber, the mayor, presided. On the motion of the Rev. Dr. Warre, seconded by Mr. Heaton, the following resolution was agreed to:—"That this committee desires to express its dissatisfaction that practically no steps have been taken by the Thames Conservancy to mitigate the severity of floods in the Thames valley, although a year has elapsed since the destructive flood of November, 1894, and that a deputation be appointed to wait upon the President of the Board of Trade to lay the whole subject before him, and to ask him if the Government can afford any assistance to the committee in the important object which it has in view."—It was also agreed to appoint a sub-committee to draw up a memorial to the President of the Board of Trade requesting him to receive the deputation.

THE REBUILDING OF HIGHGATE ARCHWAY.—The rebuilding of Highgate Archway will not be commenced for some little time. The London and Middlesex County Councils, Islington Vestry, and Hornsey District Council, who were to jointly carry out the work at a cost of about 27,000*l.*, are now going to confer as to whether the new structure shall be of iron or stone. It iron is used there will be a saving of about 6,000*l.* or 7,000. The London County Council and the Islington Vestry favour iron, while the Middlesex County Council and Hornsey District Council are for stone. One reason given by the latter bodies is that the New River Company, whose pumping-station adjoins, object to an iron bridge, but as they are not going to contribute a single farthing towards the cost of the work it is difficult to understand why they are being considered in the matter.—*Daily Chronicle.*

THE EAST LONDON WATER COMPANY'S RESERVOIRS.—The work of constructing the new reservoir for the East London Water Company at Hagger-lane, Walthamstow, has been seriously interrupted. The centre arch of the massive central wall has given way and tons of earth banked behind it have fallen down. Had the mishap happened during the day when the men were at work it is probable that it would have been attended by many fatalities. As it was no personal injuries were sustained. One result of the unfortunate occurrence is that a large number of men have been temporarily thrown out of employment.—*Essex Chronicle.*

THE VESTRIES AND THE WATER SUPPLY.—At the ordinary fortnightly meeting of the Bermondsey Vestry on the 4th inst., presided over by Mr. A. Pomeroy, the Finance Committee reported that an account was sent in to the Southwark and Vauxhall Water Company, amounting to 144*l.* 18s. for supplying the inhabitants of the parish with water during the severe frost of last winter. The company had written stating that they could not accept or recognise any liability or responsibility whatever in the matter. Mr. Ball said he was not sure whether the Vestry had any real claim on the company, but the Committee were strongly of opinion that the money should be paid. If the company continued in their refusal to pay the money, he believed the Vestry had no power to force them to do so. He moved the adoption of the report. Mr. Maule seconded, and said the Lambeth Waterworks Company had reimbursed the Vestry in a similar case, and he thought the Southwark and Vauxhall Company should be made to do the same. The Vestry ought also to express their opinion of their sense of the injustice of the matter. The report was adopted, and it was decided to send two of the officials of the Vestry to see if they could come to any settlement with the waterworks company. The General Purposes Committee reported the receipt of a letter from the Lambeth Water Company asking if the Vestry would be prepared to assist the company in supplying householders with water by means of water-carts in the

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered.
Sewerage Scheme	Wantage U.D.C.	25 Guineas	Nov. 28
*Rebuilding Infirmary	Manchester Royal Infirmary	.....	Nov. 30
*Public Baths	Lincoln Corp.	20*l.* each	do.
*Erection of Club Premises	Woking Horsell and District Conservative Club Co. Lim.	.....	No date

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
*Enlargement of School of Art	Borough of Crewe	J. Stevens	Nov. 19
House and Offices, Harras-road, Whitehaven	D. Watson	W. G. Scott & Co.	do.
New Street, near Alma-road	Rotherham Sch. Bd.	H. L. Tacon	do.
School, Raphoe, Ireland	Rev. P. Kelly	.....	do.
Water Mains (6,000 yds.), &c.	Llangollen U.D.C.	*Official*	do.
Setts an l Kerb, Belle Vue, Lancs.	Gorton U.D.C.	do.	do.
*Fitting and Furnishing Public Library	Tottenham U.D.C.	do.	do.
Shop, &c. Morley-lane	Linthwaite (Yorks) U.D.C.	Abbey & Hanson	Nov. 20
Brick Sewer, Buxton-road	Stockport Corp.	J. Atkinson	do.
Cast-iron Pipes (3,500 yds.), &c. Grewelthorpe	Ripon R.D.C.	A. E. Preston	do.
Cast-iron Water Pipes and Castings (4,300 yds.), Kirby Malzeard	do.	do.	do.
Laying Cast-iron Pipes (3,500 yds.), Grewelthorpe, Yorks	do.	do.	do.
Stable and Coachhouse, Hilderthorpe, Bridlington Quay	Captain R. Watson	S. Dyer	do.
Reservoirs, &c. Corsehouse Farm	Stewarton (N.B.) Police Commrs.	A. S. Adam	do.
Rebuilding Cheapside Mill, Batley	.....	W. Crawshaw	do.
Cemetery Drainage	Blackburn Corp.	G. W. Lund	Nov. 21
Water Supply, Brereton, near Rugeley	Lichfield R.D.C.	W. E. Rogers	do.
Fireclay Sanitary Pipes, West Moor	Tynemouth R.D.C.	*Official*	do.
Sea Defences, Clacton-on-Sea	C. G. Rounds' Trustees	T. H. Baker	Nov. 23
Brick Sewer, &c. near Bury Bridge	Bury (Lancs) Corp.	J. Cartwright	Nov. 25
Bakery, Abattoirs, &c. Stanley-street	Colne (Lancs) Dist. Co-op. Soc.	G. Bower	do.
Bailiff's House	Tunbridge Wells T.C.	T. E. W. Mellor	do.
*Erection of Infectious Hospital	East Grinstead U.D.C.	W. W. Gale	do.

CONTRACTS—*Continued.*

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered
*Paving New Streets	Camberwell Vestry	O. S. Brown	Nov. 23
Sewerage Work	Ashton - under - Lyne Corp.	*Official*	do.
Paving, &c. Upper North-street	Luton T.C.	do.	Nov. 28
Cast-iron Water Pipes (800 tons), Ormskirk	Lathom and Burscough U.D.C.	Wood & Brodie	do.
*Roadmaking and Paving Works	Willesden D.C.	O. Claude Robson	do.
Schools, Offices, &c. Chamberlayne-road	Eastleigh (Hants) Sch. Bd.	Mitchell, Son, & Gutteridge	do.
Kerb, Setts (Haslingden stone)	Bury (Lancs) Corp.	J. Cartwright	do.
Laying, &c. 50,000 yds. Cast-iron Water Mains	Lathom and Burscough U.D.C.	Wood & Brodie	do.
Sewering, Draining, &c. Mills Hill-road	Middleton (Lancs) Corp.	W. Welburn	Nov. 27
*Making-up and Paving Ryecroft-street	Fulham Vestry	C. Botterill	do.
Road Works, Pine-street	Jarrow Corp.	J. Petree	Nov. 28
Mill, Engine-house, &c. Leeds-road, Huddersfield	.....	Jno. Kirk & Sons	do.
Waterworks and Pipe Laying (8,000 yds.)	Sheffield Gas Light Co.	Jas. Fraser	Nov. 30
*Erecting Purifying House	New Malden (Surrey) U.D.C.	F. W. Stevenson	do.
Blue Pennant Kerbing, &c.	J. Hutchinson	T. V. H. Davison	do.
New Road, Sleights Moor, Sleights, Yorks	Folkestone Sch. Bd.	.....	do.
Schools, Sidney-street	Glasgow Corp.	J. Gardner	Dec. 5
Paving Work	L. B. & S. C. Ry. Co.	*Official*	do.
*Construction of Railway	Mr. Donald	do.	Dec. 14
Cottage, Stable, &c. Camerton Moor, Cumberland	F. Fielding & Co.	.....	No date
Six Cottages, Cwmtillery, Wales	.....	E. A. Lansdowne	do.
Villa, Holly Hall, near Dudley	.....	Thos. Robinson	do.
Additions, &c. to Theatre, Hull	.....	Smith & Co.	do.
Schools, Leigh, Lancs.	.....	Bradshaw & Gass	do.
Infirmary Wards, Paisley	.....	T. G. Abercrombie	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.
*Chief Resident Engineer	L. B. & S. C. Ry. Co.	1,000*l.*	Nov. 25
*Engineer	Garstang R.D.C.	.....	Nov. 27
*Resident Engineer and Clerk of Works	Portishead U.D.C.	3*l.* 10s. weekly	Nov. 30

Those marked with an asterisk (*) are advertised in this Number. *Competitions, p.* iv. *Contracts, pp.* iv., vi., viii., & xviii. *Public Appointments, p.* xvi.

event of a severe frost, and inquiring what the charge would be per day, including a horse and two men, and the Committee advised that the company should be informed that the Vestry was prepared to do so. This was agreed to, and it was also decided that a communication should be sent to the Southwark and Vauxhall Water Company stating that the Vestry were also prepared to supply them in a similar manner.

THE LONDON WATER INQUIRY.—The inquiry into the supply of water in London for sanitary purposes was resumed on the 7th inst. at the Guildhall, Westminster, before Colonel Ducat, C.E. Sir Frederic Bramwell, examined by Mr. Pember, Q.C. (for the companies), said that in his opinion the three-gallon flush demanded by the County Council was not only unnecessary, but harmful; the present two-gallon flush was ample. The quantity used for flushing purposes had very much increased during past years, and any further and compulsory increase would mean an early enlargement in the capacity of the mains. In cross-examination Sir Frederic said an increase of one gallon in the flushing capacity of cisterns would mean an increase in the water-supply of 10,000,000 or 12,000,000 gallons daily.—This concluded the evidence on the part of the companies. Mr. Freeman (for the London County Council) then put into the box Mr. Walker, Superintendent of the County Council-buildings in East Greenwich, who said that he had charge of 3,400 tenements. During the past twelve months there had been twenty-one stoppages from drains other than by frost.—Mr. Satchwell, superintendent of the County Council-buildings in Hughes'-fields, gave similar evidence.—Mr. Pember, Q.C., then summed up on behalf of the companies. He submitted that they were called upon to make good the defects of the sanitary engineer, the plumber, and the architect in the sanitation of houses. Water was far too precious a commodity to be wasted in these days when water-sheds were being snapped up. He maintained that there was no greater waste of water going on anywhere, and no worse fittings put in anywhere, than in the county of London. Therefore his contention was that new regulations ought not to be made until something had been done to prevent the large waste of water which now went on. Regulations such as the County Council sought would mean the expenditure of a million a year. Given a good cistern, a proper down-pipe of 1¼-in. diameter, a proper flush, and a good short-hopper pan with a proper rim, and he maintained that the evidence he had adduced showed that a two-gallon flush was ample. — The inquiry was then adjourned until the 8th inst. when Mr. G. M. Freeman, on behalf of the London County Council, replying generally on the case submitted by both sides to the inspector, said he fully concurred in what had been said by his learned friend, Mr. Pember, as to the great importance of this inquiry from a public point of view, though he (Mr. Freeman) estimated that importance mainly from the sanitary necessity of having a sufficient water supply to flush the house-drains of the Metropolis in an efficient manner with a view to the preservation of the health of the population. In advocating the desirability of substituting a three-gallon for a two-gallon flush, the learned gentleman put it to the inspector why, when the Municipal Authorities of Edinburgh, Bradford, Croydon, Plymouth, and Gloucester had found it necessary to resort to the increase of one gallon on the two which had previously been considered requisite, that which had been deemed a public requisite in these populous provincial centres should not also be needed in the Metropolis. In conclusion, he argued that the requisites insisted upon by the witnesses examined on behalf of the companies as essential to the efficacy of a two-gallon flush were so numerous and exacting as in reality to put their case outside the range of practical application. The County Council asked for no retrospective order, but merely that in all future cases the fittings should be such as would give at least a three-gallon flush. As to the evidence put forward on behalf of the water companies with regard to the enormous increase of water supply that would be necessitated if the proposal made by the County Council were adopted, he contented that the figures given had been ridiculously exaggerated. He claimed that a sufficient case had been made out for the demand made by the County Council, that the demand had been made after due consideration of the necessity for what was asked in behalf of the sanitary needs of the population, that neither in the inception of their proposal nor the conduct of their case had the County Council been actuated by any feeling of hostility to the water companies, but merely by a desire to promote the general good of the community, and that upon a review of the whole of the facts it would only be right and reasonable that the water companies should be required to comply with the demand made upon them by the body representing the interests of the inhabitants of this great Metropolis. — This concluded the inquiry, and arrangements having been made for an inspection by Colonel Ducat of some of the representative blocks of artizans' dwellings in the districts served by different water companies, the proceeding terminated.

MEMORIAL TABLET, DANBURY CHURCH, ESSEX.—The unveiling of the tablet to the memory of the late Sir T. P. Bridges, Bart., took place recently in the Danbury Parish Church. The memorial is the design of Mr. Arthur Bartlett, architect, of London.

ART AND INDUSTRIAL EXHIBITIONS.—A loan exhibition of pictures, engravings, old prints and books, foreign and other curios, and specimens of amateur work was opened on the 4th inst. in Paris-street, Exeter.—The National Trades and Industrial Exhibition, in the East End Exhibition Buildings, Glasgow, was opened on the 4th inst. by Bailie Ure Primrose.—On the 4th inst. an industrial exhibition was opened in the Corn Exchange, Haddington, under the auspices of the East Lothian Industrial Association. There are four principal sections, comprising needlework, mechanical work, decorative work and furnishings, and painting, drawing, engraving, and photography. An interesting adjunct to the industrial exhibition is a large loan collection, displayed in the side room of the Exchange. This collection was brought together principally through the efforts of Lady Grizell Baillie Hamilton, and contributions were sent from several of the county mansions.

SURVEYORS' INSTITUTION. — At the ordinary meeting of this Institution on Monday last in Great George-street, Westminster, it was announced that the Institution is about to follow the example set by the Civil Engineers, on the opposite side of the street, by erecting a new building of extensive dimensions. Mr. D. Watney, in delivering his opening address as President, said the new building would be worthy of the Institution, which had long ago outgrown its present home. The address covered a wide range of subjects, such as betterment, the price of land, local taxation, and agricultural depression, a remedy for which, the President thought, might be found in organisation and co-operation. Forestry was referred to as a subject to which the Council were devoting special attention, and in the new building there would be a department in which that important branch of surveying could be studied.

THE EXCAVATIONS AT DORE ABBEY.—The excavations on the site of the nave of the Cistercian Abbey of Dore, about twelve miles from Hereford, and at the southern end of the Golden Valley, have revealed the position of the west wall at its north-west corner, and also the bases of all the columns, except two, which supported the north arcade. The nave was of nine bays, divided by circular columns 3 ft. 6 in. in diameter, and standing on square bases or plinths. At the second column west of the crossing the base of the great rood-screen was found, partly composed of thirteenth-century worked stones reused. Many of these still retained traces of colour, and fragments of a shrine or tomb found close by were also elaborately coloured and gilt. The rood-screen crossed the aisles as well as the central alley. Some screenwork was found of stone, of the thirteenth-century, also fragments of armorial and embossed tiles. The excavations have been made by Mr. Roland Paul.

A A. CAMERA CLUB.—At the meeting of this club last Wednesday, a paper on "Canterbury Cathedral" was read by Mr. Charles H. Freeman, illustrated by lantern views of various parts of the building taken by two members on the occasion of the visit of the club to Canterbury two years ago. No opportunity had presented itself of showing their work on the screen; but this was done on Wednesday, and the historical and architectural notes contributed by Mr. Freeman helped to make an interesting and instructive exhibition.

LEGAL.

COST OF REPAIRING A DEFECTIVE DRAIN:

UNDER THE METROPOLIS MANAGEMENT ACT, 1855.

THE case of Florence *v.* The Paddington Vestry, which came before Mr. Justice Chitty in the Chancery Division last week, raised an important point as to the cost of repairing a defective drain under Section 250 of the Metropolis Management Act, 1855.

The facts are shortly as follows:—In 1894 the plaintiff purchased the freehold of Nos. 149 and 151, Church-street, Paddington, and shortly afterwards received from the defendants a notice to repair a defective drain. The plaintiff opened up the drain, and then discovered that premises at the rear belonging to another owner were drained into the drain. The plaintiff then claimed repayment by the defendants of 47*l.*, the sum expended by him in repairing the drain, on the ground that it was a sewer within the meaning of Section 250 of the Metropolis Management Act, 1855, and therefore repairable by the Local Authority. The connexion with the drain was made about thirty years ago by permission of the then occupant of the Church-street houses and without the authority of the Vestry. The plaintiff, when he purchased the property, made no special inquiry as to the drainage.

His Lordship, after hearing evidence and the arguments of counsel, said that the case of Kershaw *v.* Taylor (L. R. 1895. 2 Q. B. 471), governed the case in question. The connexion in the present case was made without the consent of the Local Board or the owner of the house. In Kershaw *v.* Taylor a scheme of drainage had been approved by the Local Authority, but the drains constructed were not in accordance with the scheme, consequently, in both cases the drain was unlawfully made, and not under any order from the Local Authority. The connexion in the present case was unlawfully made, but the plaintiff did not claim under the person making the unlawful connexion. The plaintiff had no notice that anything unlawful had been done, and further, he was not bound to inquire as to another's acts. In these circumstances, he thought that the plaintiff was entitled to a declaration that the drain was a sewer, and to be repaid the money he had expended in repairing it.

Judgment accordingly.

Mr. Byrne, Q.C., and Mr. R. F. MacSwinney represented the plaintiff; and Mr. Farwell, Q.C., and Mr. Nash, the defendants.

MEETINGS.

FRIDAY, NOVEMBER 15.

Sanitary Institute (*Lectures for Sanitary Officers*).—Mr. W. C. Tyndale on "House Drainage." 8 p.m.

MONDAY, NOVEMBER 18.

Royal Institute of British Architects.—(1) Presentation of the Portrait of the ex-President, Mr. J. Macvicar Anderson; (2) Dr. A. S. Murray, F.S.A., on "The Sculptured Columns of the Temple of Diana at Ephesus." 8 p.m.

Carlisle Architectural, Engineering, and Surveying Society.—Mr. P. Fitzgerald on "Robert Adam and his Architecture." 8 p.m.

TUESDAY, NOVEMBER 19.

Institution of Civil Engineers.—Mr. J. H. Greathead on "The City and South London Railway: Subaqueous Tunnelling by Shield and Compressed Air." 8 p.m.

Sanitary Institute (*Lectures for Sanitary Officers*).—Professor H. Robinson on "Sewerage and Sewage Disposal." 8 p.m.

Glasgow Architectural Association.—Lecture by Mr. Percy Fitzgerald, M.A., F.S.A. 8 p.m.

WEDNESDAY, NOVEMBER 20.

Carpenters' Hall, London Wall (*Lectures on Building and Sanitary Construction*).—Professor A. Wynter Blyth on "Sanitary Appliances." 8 p.m.

Society of Arts.—Opening Address of the Session by Major-General Sir J. Donnelly, K.C.B., Chairman of the Council. 8 p.m.

Sanitary Institute (*Lectures for Sanitary Officers*).—Inspection of the L.C.C. Common Lodging-House, Parker-street, Drury-lane. 3 p.m.

Builders' Foremen and Clerks' of Works Institution.—Ordinary Meeting of the Members. 8 p.m.

Northern Architectural Association. — Mr. C. S. Errington on "Mouldings, Features, and Ornament (Mediæval)." 7.30 p.m.

THURSDAY, NOVEMBER 21.

Society of Antiquaries.—8.30 p.m.

Dundee Institute of Architecture.—Annual Conversazione, Victoria Art Galleries.

FRIDAY, NOVEMBER 22.

Architectural Association. — Dr. G. B. Longstaff, L.C.C., on "The Municipal Control of Buildings." 7.30 p.m.

Sanitary Institute (*Lectures for Sanitary Officers*).—Mr. Charles Mason on "Scavenging, Disposal of House Refuse." 8 p.m.

SUNDAY, NOVEMBER 24.

Sunday Lecture Society (*St. George's Hall, Langham-place*).—Mr. Wyke Bayliss on "The Use of the Supernatural in Art." 4 p.m.

RECENT PATENTS:

ABSTRACTS OF SPECIFICATIONS.

20,155.—CONCRETE PAVEMENT: *J. McQuone.*—A composition for sporting tracks, footpaths, &c., composed of red shale, ashes, flue dust, gravel or granite chips, and ground blue lias lime, mixed together, with water in equal proportions.

20,483.—PIPES: *F. Brook.*—Means for jointing stoneware or earthenware sewage pipes. Relates to the employment of an elastic ring for temporarily enclosing the annular space for grouting with fluid cement. For rendering the joints capable of a certain amount of either telescopic or bending motion, hard composition rings cast on to the spigot end of each pipe and at the inner end of the socket, are provided with cup and ball surfaces, between which an elastic, or viscous, or compressible coating is placed.

22,001.—FIREPROOF BUILDINGS: *W. Youlten.*—Walls or floors of buildings are constructed of tubes or solid blocks of polygonal outline in cross section placed alternately in juxtaposition to other tubes or blocks having corresponding re-entrant angles to fit the exterior angles of the polygons of the neighbouring blocks or tubes.

22,077.—WINDOWS: *W. Nicol.*—Relates to devices for enabling window-sash frames to be swivelled within apartments. A U channel or groove is formed in one side of each sliding sash-frame, with a similar shaped metal bush sunk and secured in it. A plate is secured to the fixed frame, and formed with a scroll-shaped bead which fits round the bush in the groove aforementioned, and, in conjunction with the same, forms a kind of hinge, the parts of which allow the sash to have a vertical sliding motion, but are prevented from lateral motion by a plate screwed to the sliding sash. During the swivelling operations the sash-cords are detached by hand and placed in grooves formed in a plate screwed to the fixed sash. Other modified arrangements are mentioned.

22,908.—WATER CLOSETS: *E Chatelain.*—A closet which, besides being much lower in the seat than usual, is narrower at the front, and has an upwardly projecting part in front of the basin so that the user is obliged to take up a more or less squatting position astride the basin.

7,195.—TILES: *A. Dawnay.*—A burnt clay or cement tile for supporting concrete between iron or steel joists. The tiles are provided with one or more stiffening webs or ribs with side gussets upon the upper surface, or instead of these gussets, a continuous coved side may be substituted. Grooves are formed on the ceiling surface of the tiles to form a key for plaster.

10,583.—SLIDE-RULES: *T. Norris.*—Relates to such slide-rules as are composed of two or more concentrically-arranged discs pivoted together. To provide a simple marker or runner by which the scales can be easily read, and to enable the upper disc to be grasped independently of the lower one. (1) A plano-convex lens, which magnifies transversely, is mounted on the marker; (2) the lower disc is provided with one or more elongated openings to permit the upper or smaller disc to be grasped between the thumb and finger and turned independently, so that both discs may be manipulated by the fingers of one hand.

14,936.—GLUE: *E. Schmahl and another.*—Making glue by the addition of glycerine to the glue or size that has been mixed with a liquefying agent (such as sal ammoniac) with the object of preventing the glue or size from cracking when dry.

16,410.—SAWS: *C. Douglas.*—Refers chiefly to circular saws, the teeth of which are so formed that the back or outer edges have a clearance of less than 5 deg. angle from the line of cut. Ribs are formed on the sides of the teeth, and extend from the cutting-points to the heels, being most prominent at the point, and forming an angle of less than 1 deg. with the face of the saw-blade.

NEW APPLICATIONS FOR LETTERS PATENT.

OCTOBER 28.—20,250, W. Lord, Paving and other Blocks, Slabs, &c.—20,266, T. Atkins, Waste Water-closets.—20 269, J. Johnson, Water Flushing Cistern.—20,310, C. Fisher, Frame Bevel and Clamp.

OCTOBER 29. — 20,322, M. Aspinall, Closing Tray Arrangement to Ventilating Sewer Manhole Covers.—23,331, D. Keith, Window Sash Frames.—20,367, G. Allen, Drying Floor for Bricks, Tiles, Pottery, &c.—20,395, E. Nicholson, Mouldings for Picture-frames. — 20,396, G. Robertson, Window Fastener.—20 444, J. Mitchell, Valve or Flap for Sewer-gas Interceptors.

OCTOBER 30.—20,489, T. Claughton and others, Syphon Discharge Cisterns for Flushing Purposes.—20,515, J. Gabriel, Drain-pipes.—20,517, C. Biggs, T-squares.

OCTOBER 31.—20,540, H. Vaughan, Continuous Burning Kilns for Burning Bricks, Limes, Cements, &c.—20,563, J. Lucas, Sliding and Swivelling Doors and Partitions.—20,589, R. Whyman, Wall or Ceiling Tiles. — 20,592, E. Carter, Picture-frame Cramps.

NOVEMBER 1.—20,623, D. Arthur and others, Ventilation of Drains and Sewers.—20,632, W. Bancroft and G. Priestley, Brick and Tile-making Machinery, &c.—20,672, T. Barrett, Taps.—20,687, S. Williams, Kilns or Ovens for Burning Lime, Cements, Bricks, &c.

NOVEMBER 2.—20,721, J. Edwards and P. Pepin, Door-silencer, Draught-excluder, or weather-strip combined, for Doors, Casements, Sashes, &c.—20,726, J. Schofield, Waterproof Roofing-paper for Houses, &c.—20,744, W. Thompson, Water-closets, &c.—20,770, W. Büsche, Brick-burning Kilns, &c.

PROVISIONAL SPECIFICATIONS ACCEPTED.

18,338, H. Morris, Valves of flushing cisterns, &c.—18,381, A. Hindley, Concreting Floors, &c.—18,438, T. Clark, Flushing cisterns for Water-closets.—18,449, J. Dougan and J. McMillan, Damp-proof Courses.—18,450, J. Dougan and J. McMillan, Concrete floors.—18,979, H. Roberts, Flushing cisterns.—19,457, E. Weidlich, Ventilating and smoke-preventing apparatus —19,575, E. Smith, Window Sashes and Frames.—19,703, C. Cross, Household Water-supply System.

COMPLETE SPECIFICATIONS ACCEPTED.

(Open to Opposition for Two Months.)

24,757, J. Green and others, Ventilators.—54, G. Chisholm, jun., Sanitary Pipes.—63, A. Boult, Joints for Planking.—2,977, H. Ebrhardt, Circular Saws.—14,664, E. Bernard, Connexions for Earthenware Water-closets, &c.—17.441, H. Maass and P. Claussen, Removing Mist or Vapour from Shop Windows.—18,113, G. Coxhead, Glazing Horticultural Buildings, &c.—18,347, E. Y. and F. Couzens, Traps or Interceptors for Drains.—18,399, J. Barron, Access to and Ventilation of Drains to reducing Sockets for Soil and other Pipes.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

OCTOBER 25.—By *Scott-Smith & Co.* (at Barnstaple): Enclosures of land, Burrington, Devon, 49 a. 0 r. 6 p., f., 865*l.*

OCTOBER 29.—By *I. Blunnerkassett* (at Abergavenny): "Wern Farm," Michaelchurch Eskley, Hereford, 28 a. 2 r. 13 p., f., 675*l.*—By *Hepper & Sons* (at Leeds): 34, Call-lane, Leeds, Yorks., f., r. 130*l.*, 2,350*l.*; 7 and 8, Mill Hill, f., r. 165*l.*, 3,150*l.*

OCTOBER 30.—By *J. Mainwaring & Co.* (at Warrington): "Poole's Farm," Stretton, Cheshire, 22½ acres, f., 2,100*l.*; eight f. cottages, 450*l.*—By *J. Johnson* (at Douglas): "The Theatre Royal," and five shops, &c., Wellington-st., Douglas, Isle of Man, adjoining, area, 7,650 ft., 1,550*l.*—By *Chinnock, Galsworthy, & Co.* (at Redhill): Three plots of bldg. land, Blandford-rd., Reigate, Surrey, f., 850*l.*

NOVEMBER 5.—By *Debenham, Tewson, & Co.*: 12, Crane-ct., City of London, f., area 750 ft., 2,340*l.*—By *R. Price & Son:* 127 and 129, Manor-st., Clapham, u.t. 20 yrs., g.r. 8*l.* 10s., r. 68*l.*, 245*l.*—By *Protheroe & Morris:* F.g.r. 38*l.* 12s., Carlton-rd., Kentish Town, reversion in 55 yrs., 1,227*l.*; enclosures of land, Wickford, Essex, 34 a. 3 r. 27 p., f., 695*l.*

NOVEMBER 8.—By *A. J. Sheffield*: 100 to 110 (even), Abbott-rd., Poplar, u.t. 78 yrs., g.r. 30*l.*, 1,350*l.*; 333 and 335, St. Leonard's-rd., u.t. 69 yrs., g.r. 10*l.*, e.r. 70*l.*, 280*l.*; 3, Hermit-rd., Canning Town, u.t. 85½ yrs., g.r. 4*l.* 10s., 240*l.*—By *Jones, Lang & Co.*; 1, Cumberland-villas, Acton, f., r. 45*l.*, 630*l.*; 17, Woodhurst-rd, f., r. 35*l.*, 445*l.*—By *Baker & Sons*: three enclosures of land, Swanley, Kent, f., 8 a. 3 r. 12 p., 685*l.*

[*Contractions used in these Lists.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent, r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard, &c.

PRICES CURRENT OF MATERIALS.

TIMBER.

Greenheart, B.G. ton	8/0/0	0/0/0
Teak, H.I. ..load	10/0/0	16/0/0
Sequoia, U.S. ft. cu	1/7	1/10
Ash, Canada load	3/0/0	4/5/0
Birch, do.	2/0/0	3/5/0
Elm, do.	3/15/0	5/0/0
Fir, Dantsic, &c.	2/0/0	3/10/0
Oak, do.	2/15/0	4/15/0
Canada	6/5/0	7/15/0
Pine, Canada red	0/0/0	0/0/0
Do. Yellow	2/10/0	4/15/0
Lath, Dantsic, fath	4/10/0	5/10/0
St. Petersburg..	5/0/0	6/10/0
Wainscot, Riga, &c., log	2/15/0	5/0/0
Odessa, crown....	2/15/0	5/0/0
Deals, Finland 2nd & 1st std 100	7/0/0	8/10/0
Do. 4th & 3rd ..	7/0/0	8/0/0
Do. Riga	7/0/0	8/0/0
St. Petersburg, 1st yellow ...	9/10/0	12/0/0
Do. 2nd yellow	7/10/0	9/0/0
Do. white	8/0/0	9/10/0
Swedish	7/0/0	15/10/0
White Sea.....	7/5/0	14/0/0
Canada, Pine 1st	21/0/0	24/0/0
Do. do. 2nd....	16/0/0	17/0/0
Do. do. 3rd, &c.	8/0/0	10/0/0
Do. Spruce, 1st..	9/0/0	10/10/0
Do. do. 3rd and 2nd	6/10/0	7/10/0
New Brunswick	6/0/0	7/0/0
Battens, all kinds	5/0/0	20/0/0
Flooring boards, sq., 1 in. prep. 1st.....	0/9/6	0/14/6
Do. 2nd	0/6/6	0/11/6
Other qualities—	0/4/6	0/7/6
Cedar, Cuba ..ft.	/4	/4½
Honduras, &c.	/3½	/4½
Mahogany, Cuba	/2½	/6
St. Domingo, cargo av.	/3½	1/0
Mexican do. do.	/3½	/4½
Tobasco do. do.	/4	/6
Honduras do. ..	/4	/6
Box, Turkey ton	4/0/0	15/0/0
Rose, Rio	7/0/0	16/0/0
Bahia	6/0/0	15/0/0
Satin, St. Domingo	0/0/6	0/2/0
Satin, Porto Rico	0/0/6	0/1/6
Walnut, Italian....	0/0/3	0/0/7

METALS.

Iron—Pig, in Scotland .....ton	2/6,8	0/0/0
Bar, Welsh, in London	5/12,6	5/15/0
Do. do. at works in Wales.....	5/2/6	5/5/0
Do. Staffordshire, in London.....	6/0/0	6/10/0
COPPER—British cake and ingot	47/5/0	47/15/0
Best selected ..	48/0/0	48,10/0
Sheets, strong..	54/0/0	0/0/0
Chili bars	43/17/6	44/2,6
YELLOW M'TAL	0/0/4 9-16	0/0/4⅝
LEAD—Pig, Spanish ....ton	11/5/0	11/7/6
English com. brands	11/8/9	11/10/0
Sheet, English, 6 lbs. per sq. ft. and upwards ..	12/1c/0	12 12 6
Pipe	12/10,0	0/0/0
ZINC—English sheet .....ton	18/5 0	18/10/0
Vieille Montagne	18/15/0	0/0/0
TIN—Straits.....	65/7/6	65/17/6
Australian.....	66/5/0	65/15/0
English Ingots.	68/10/0	68/15/0
Banca.....	67/0/0	67/5/0
Billiton	66/10/0	66 15/0

OILS.

Linseed .....ton	20/0/0	20/10/0
Cocoanut, Cochin	25/0/0	25/5/0
Do. Ceylon	22 15/0	0,0/0
Palm, Lagos	23/0/0	0/0/0
Rapeseed, English pale.....	24/0/0	24/5/0
Do. brown	22/10/0	22/15/0
Cottonseed ref. .	17/c/0	17/10/0
Oleine.....	19/10/0	20/10/0
Lubricating, U.S.	5/6/0	8/0/0
Do. black	4/9/0	6 6/0
TAR—Stockholm barrel	0/19/6	0/0/0
Archangel.....	0/15 0	0 0/0

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays.* N.B.—We cannot publish Tenders unless authenticated by the name and address of the sender.]

ALVERSTOKE (Hants).—For the erection of a villa residence at Alverstoke, Gosport, for Mr. W. E. Churcher. Mr. H. A. F. Smith, architect, Gosport:—

W. R. Light & Son....	£2,940	0	C. M. Dash..... £2,901 0
W. Hill & Co.	2,931	0	W. Ward & Son 2,789 0
J. Croad	2,927	0	C. Lear & Son* 2,787 15

* Accepted.

ANDOVER (Hants.).—For the execution of drainage works, Junction-road, also digging stone water-well, Winchester-road, for the Urban District Council. Mr. Alf. Purkess, Borough Surveyor, Andover, Hants.:—

	Drain.	Wall.
W. H Saunders & Co.....	£245 10	—
Annett & Son	195 0	£50
Frank Beale, Andover*	171 15	39

* Accepted.

BECKENHAM.—For building a kitchen (Contract No. 1), and for works of drainage (Contract No. 2) at the "George-Inn," Beckenham, Kent. Mr. Robt. M. Chart, architect and surveyor, Union Bank Chambers, Croydon:—

	No. 1.	No. 2.	Total.
D. Waller, jun.....	195 0 0	79 10 0	274 10 0
E. Goulder	182 0 0	69 0 0	251 0 0
Howard, F. G.....	149 15 0	75 5 0	225 0 0

BEN RHYDDING (Yorks.).—For the construction of a drive, for Mr. W. A. G. Walker. Mr. B. Walker, surveyor, The Exchange, Bradford:—

Walter Barraud, Randall Well-street, Bradford £170

BLACKBURN.—Accepted for additions to St. Silas's school-buildings. Mr. J. Bintley, architect, 7, Lowther-street, Kendal:—

C. Hindle, Blackburn £1,465 0 0

CARNOUSTIE (N.B.).—For the construction of storage reservoir, Brax, for the Commissioners. Messrs. M'Culloch & Jamieson, C.E., 10, Whitehall-street, Dundee:—

Alex. Crane £4,050	0	0	Peter Glority £2,662	8 5
Geo. Lawson	3 807	16 9	R. C. Brebner	2,661 18 0
Jas. Watson	3.522	6 0	Thomas Lyall	2,659 3 3
George Dick	3.440	0 0	W. Anderson	2,597 13 3
David Shanks	2,936	16 6	Alex. Bremner.....	2,443 14 6
George Finnie	2,900	16 0	Charles Wilson.....	2,100 0 0
Henderson & Duncan	2,854	0 4	Alex. Brunton & Son, Queensferry*	1,899 1 9

* Accepted.

CARSHALTON.—For the erection of a billiard-room at Hill House, Carshalton, Surrey, for Captain Thos. Goodson, J.P. Mr. Robt. M. Chart, architect, Union Bank Chambers, Croydon, and Mitcham, Surrey:—

Duncan Stewart.....£485		I. Burges £370	
D. Waller, jun.....	450	E. J. Bunaud, Wallington*..	353

* Accepted.

CORK.—Accepted for the erection of hospital, Western-road. Mr. J. F. McMullen, architect, 30, South Mall, Cork. Quantities by Mr. Richard Evans, Blackrock, Cork :—
Richard W. Johnson, Marina, Cork £5,747
Six tenders.

EASTLEIGH (Hants.)—For the erection of new Baptist church, Messrs. Lawson & Donkin, architects and surveyors, Yelverton Chambers, Bournemouth. Quantities supplied by architects :—

	Chapel.	School.	Total.
W. Pearcy	889 19 0	230 0 0	1,122 8 0
Trehearn	863 6 11	239 1 11	1,102 8 10
W. J. A. Chinchen	895 0 0	195 0 0	1,090 0 0
Burt & Vick	861 0 0	199 10 0	1,060 10 0
F. Elcock	825 0 0	222 0 0	1,047 0 0
Wickham	822 0 0	215 0 0	1,037 0 0
C. Hunt	791 18 10	189 12 2	981 11 0
Rowland, Southampton *	711 0 0	185 0 0	896 0 0

* Accepted.

EGREMONT (Cheshire).—Accepted for the execution of sewerage works, New Brighton, for the Wallasey Urban District Council. Mr. A. Salmon, C.E., Public Offices, Egremont :—
J. McCabe & Co., Ormskirk, Liverpool.....£2,739 0 0

HAMPSTEAD MARSHALL (Berks.).—For taking down and rebuilding the Schools, for the Trustees. Mr. James H. Money, architect, The Broadway, Newbury :—

E. C. James	£429	Geo. Brown	£328
Geo. Elms	330	Pope & Co., East Woodhay *	313

* Accepted.

HINCKLEY (Leics.).—For the execution of drainage works, &c., for the Urban District Council. Mr. W. T. Howse, Surveyor, Council Offices, Castle-street, Hinckley :—

C. Haywood	£795 0 0	James Mason	£528 17 0
John Holme	677 8 5	D. H. Porter	525 0 0
Baker & Bailey	555 3 6	Alf. Jewell, Market Harborough *	275 0 0
H. Burnham	545 0 0		

* Accepted.
[Surveyor's estimate, £321 1s. 9d.]

LONDON.—For the erection of eight houses, Harrow. Mr. Basil Slade, architect, 3, Grosvenor-street, W., for the detached houses, and Mr. Solomon Ford, 3, Queen-street, Cheapside, for the semi-detached houses :—

	Detached.	Semi-detached.
Wilkinson & Son	£4,000	£4,600
Elkington & Co.	3,839	4,665
Scott & Phillips	4,532	4,652
Sumner & Co.	2,788	3,444
W. Fortescue	4,059	4,720
F. J. Chinchen	5,000	5,830
J. Denton	4,920	5,400
J. White	2,700	2,100
Jarrett	2,700	2,400
Roach Bros.*	2,502	3,000

* Received too late, but opened by request.

LONDON.—For the erection of a new mission hall and choir vestry at Nunhead, for the Trustees of the Cheltenham College Mission. Messrs. C. & A. N. Innes, architects, 27, Queen-street, E.C. Quantities by Mr. G. Silvester :—

	Mission Hall and Vestry.	Mission Hall only.
Downs	£882	£765
Marsland	845	735
Parker	820	719
Hart Bros.	819	713
Balaam Bros.	740	645
Richardson	725	630

LONDON.—Accepted for the erection of six dwelling-houses, Duckett-street, Stepney. Mr. Henry Roberts, architect :—
W. T. Ellis, jun. £1,800
[No competition.]

LONDON.—Accepted for laying new gutters, and making and fixing sky-lights to foundry-roof, Holborn Viaduct, E.C. :—
George Barker £110

LONDON.—For providing an additional room at the lodge in Finsbury Park, examining the drainage, and for works of repair and painting at the building, for the London County Council. Mr. Thomas Blashill, Architect :—

A. Wallis	£282 0 0	W. Wells	£230 0 0
F. Britton	273 0 0	Williamson & Sons	219 15 5
P. Hart	270 16 0	W. Pancy	216 0 0
T. Lapthorne & Co.	246 0 0	W. Thorne	212 8 4
R. Harding & Son	243 2 5	G. E. Jeffries	193 10 0

LONDON.—For the supply and erection of three centrifugal pumps at the Heathwall pumping station, for the London County Council :—

R. Warner & Co.	£3,330 0	J. Blakeborough & Sons	£2,556 0
Cornes, Martin, & Co.	2,770 0	Gwynne & Co.	2,272 0
Drysdale & Co.	2,682 0	J. Cochrane	2,200 0
Tangyes, Ltd.	2,675 0	W. Beaumont (irregular)	1,925 4
Entwisle & Glass, Ltd,	2,570 0	W. R. Renshawe & Co.	1,839 0

PORTMADOC (Wales).—For repairs and improvements to main road footpaths, for the Ynyscynhaiarn Urban District Council. Messrs. T. Roberts & Son, C.E., Portmadoc :—
David M. Roberts £139
William Hughes, Chapel-street, Portmadoc* 110
* Accepted.

NEATH.—For the erection of a block of almshouses and caretaker's residence, boundary-walls, and fencing, for Mrs. Llewellyn. Mr. G. E. Halliday, architect, 14, High-street, Cardiff. Quantities by Mr. J. W. Rodger, 14, High-street, Cardiff :—

Knox & Wells	£5,000 0 0	Claridge & Bloxham	£3,997 0 0
D. Jenkins	4,975 0 0	G. H. Wilkins	3,974 0 0
T. Wood & Son	4,917 10 6	D. Rees	3,798 0 0
T. Davies	4,620 12 1	E. Thomas	3,792 0 0
H. Willcock & Co.	4,587 12 2	E. Groom	3,700 0 0
S. Shepton & Son	4,515 0 0	W. Lissaman, jun., Chipping Campden *	3,670 0 0
H. David & Son	4,338 0 0	J. D. Williams	3,470 0 0
T. Watkins & Co., Ltd.	4,300 0 0	Escott & Ford	2,378 0 0
D. C. Jones & Co.	4,194 0 0		

* Accepted.

NOTTINGHAM.—For the erection of factory premises, Forster-street and Outgang-lane, for Messrs. J. F. & G. H. Perry. Mr. Lawrence Bright, architect, 9, St. Peter's Church-walk, Nottingham. Quantities by the architect :—

Geo. Caulton	£12,535	John Cooper	£11,685
John Greenwood	12,500	Thomas Cuthbert	11,490
Henry Vickers	12,064	John Oscroft	11,335
Scott & Son	12,050	Hodson & Son	11,129
A. G. Bell	12,022	Frederick Evans	10,995
Edward Woodward	11,745	J. H. Vickers	10,795
John Hutchinson	11,700	Thos. Barlow, Crocus-street, Nottingham *	10,333
Geel & Son	11,700		

* Accepted.

PORTMADOC.—For the erection of chapel, school, vestry, &c. High-street. Mr. T. Taliesin Rees, architect, Birkenhead :—

Evan Humphreys	£2,111 0	Evan Jones	£2,000 0
D. M. Williams	2,100 0	John Shaw*	1,939 0
W. H. Bleakley & Co.	2,067 10		

* Accepted.

READING (Berks.).—For the erection of a parish room, reading room, &c., Woolhampton, near Midgham, for Miss Blyth. Mr. James Newman, architect, Sandown, Isle of Wight. Quantities by the architect :—

G. S. Lewis & Brother	£1,324 0 0	H. Hoskins	£1,278 0 0
W. Stokes	1,307 10 0	J. W. Hancock	1,269 0 0
G. Simonds	1,300 0 0	J. Johnson	1,249 13 6
G. Wernham	1,298 0 0	J. H. Margetts	1,195 0 0
T. James	1,286 0 0	G. Elms Benham, Newbury*	1,158 0 0

* Accepted.

SOUTHWOLD.—Accepted for new drainage to the "Red Lion," "White Horse," and "Brickmakers' Arms" inns, for Messrs. Adnams & Co., Southwold. Mr. T. E. Key, architect, 5, Bloomsbury-square, W.C. :—
James Thompson, Southwold.....£127 13 6

SOUTHWOLD.—Accepted for erecting a new house for Mr. H. J. Debney. Mr. T. E. Key, architect, 5, Bloomsbury-square, W.C. :—
James Thompson, Southwold.....£551

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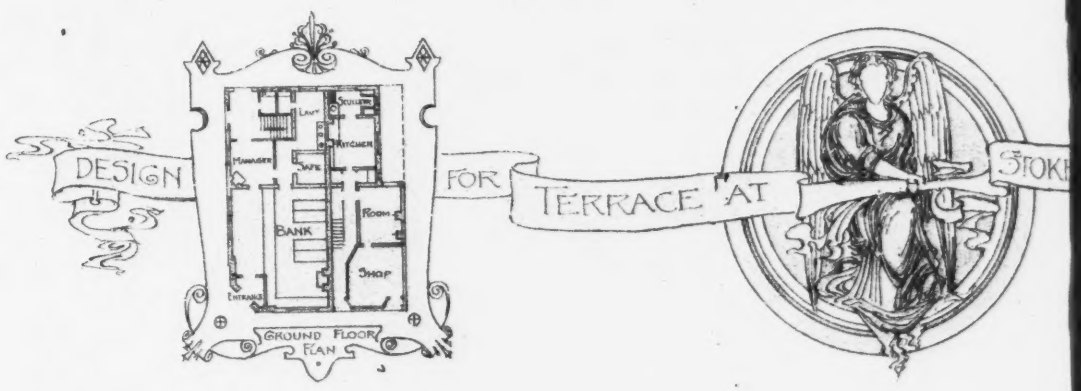

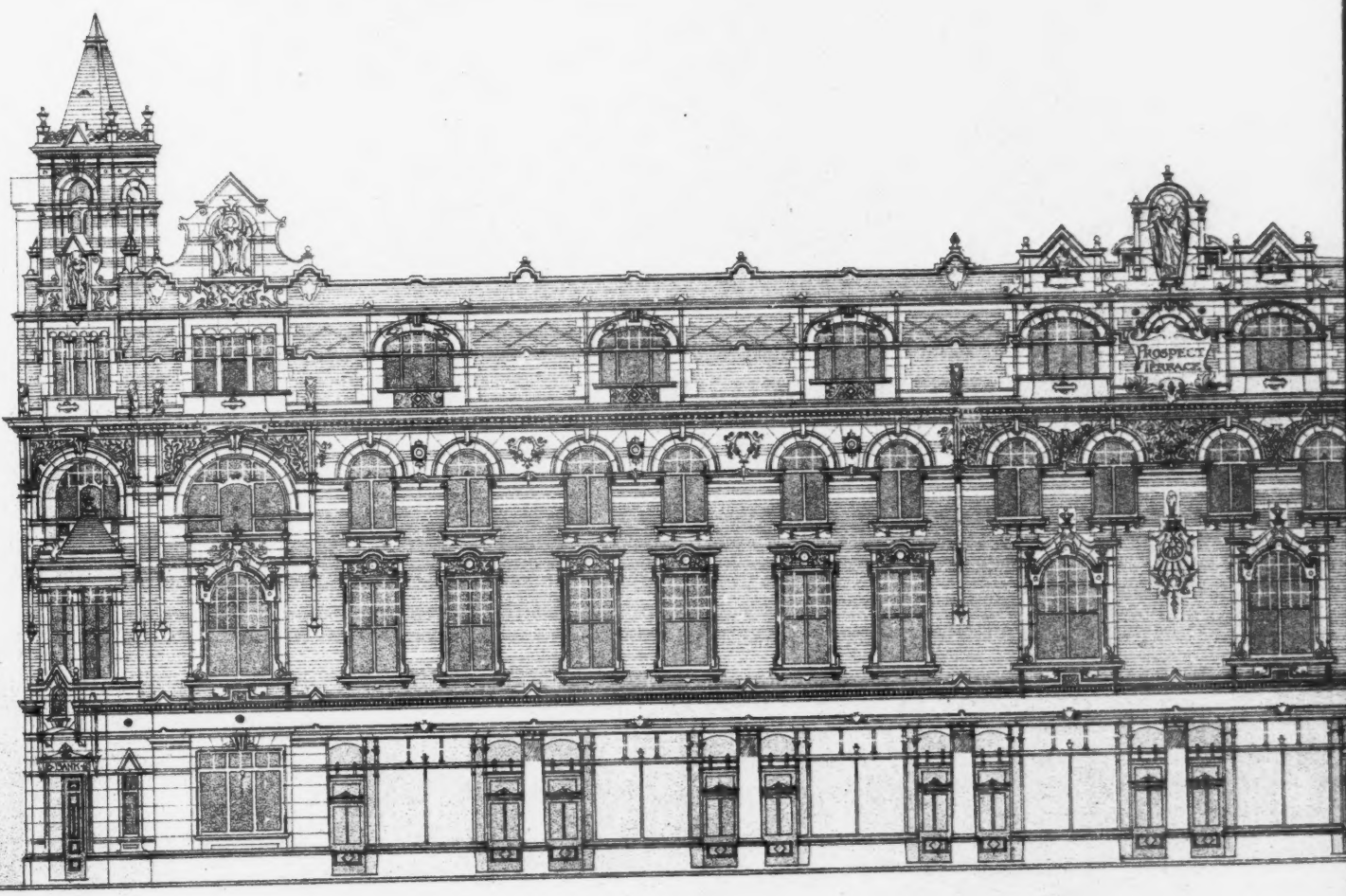

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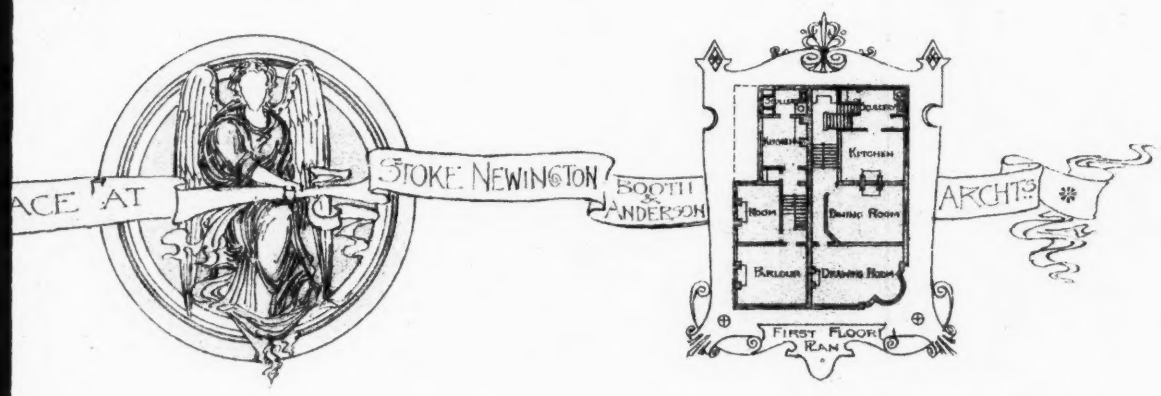

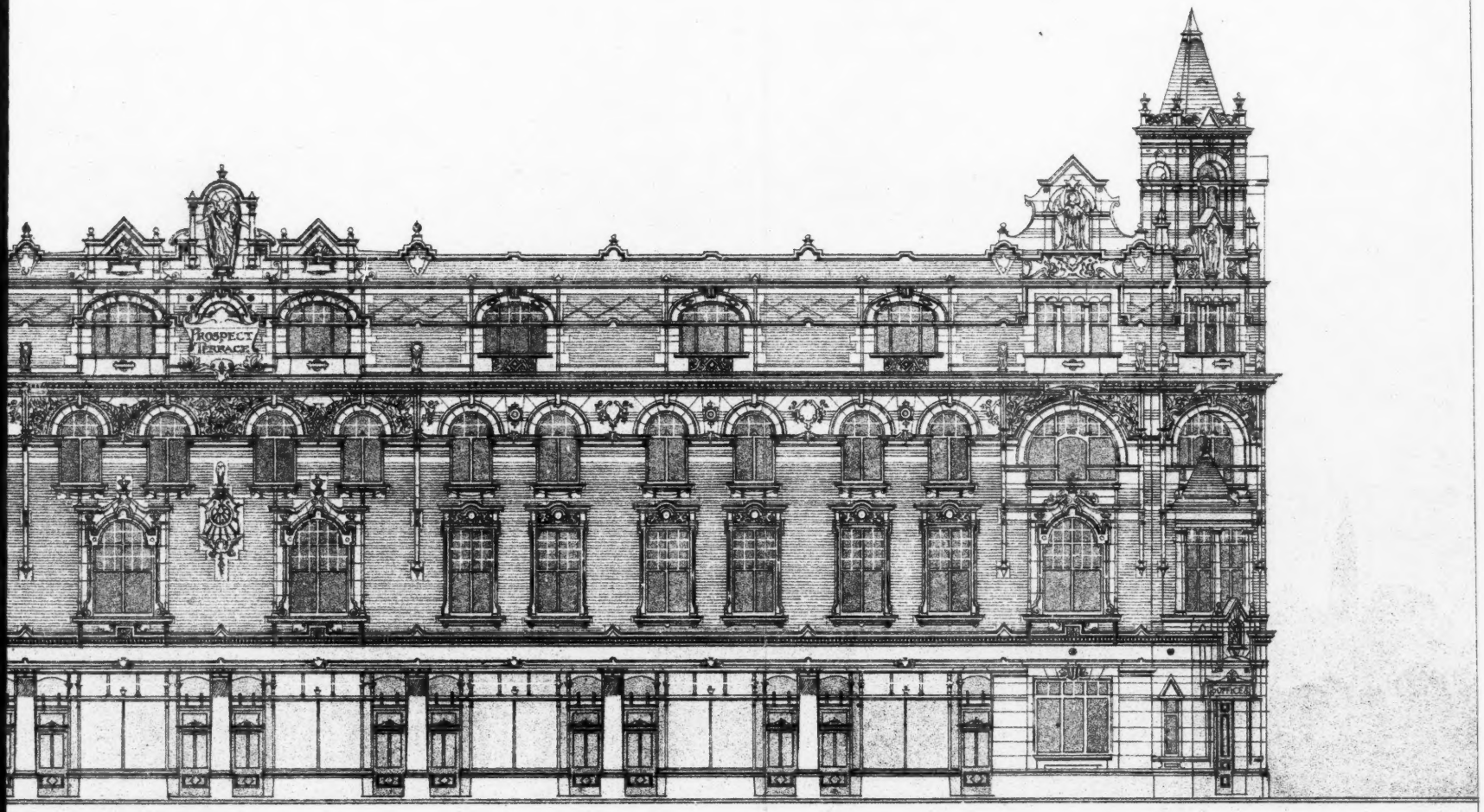

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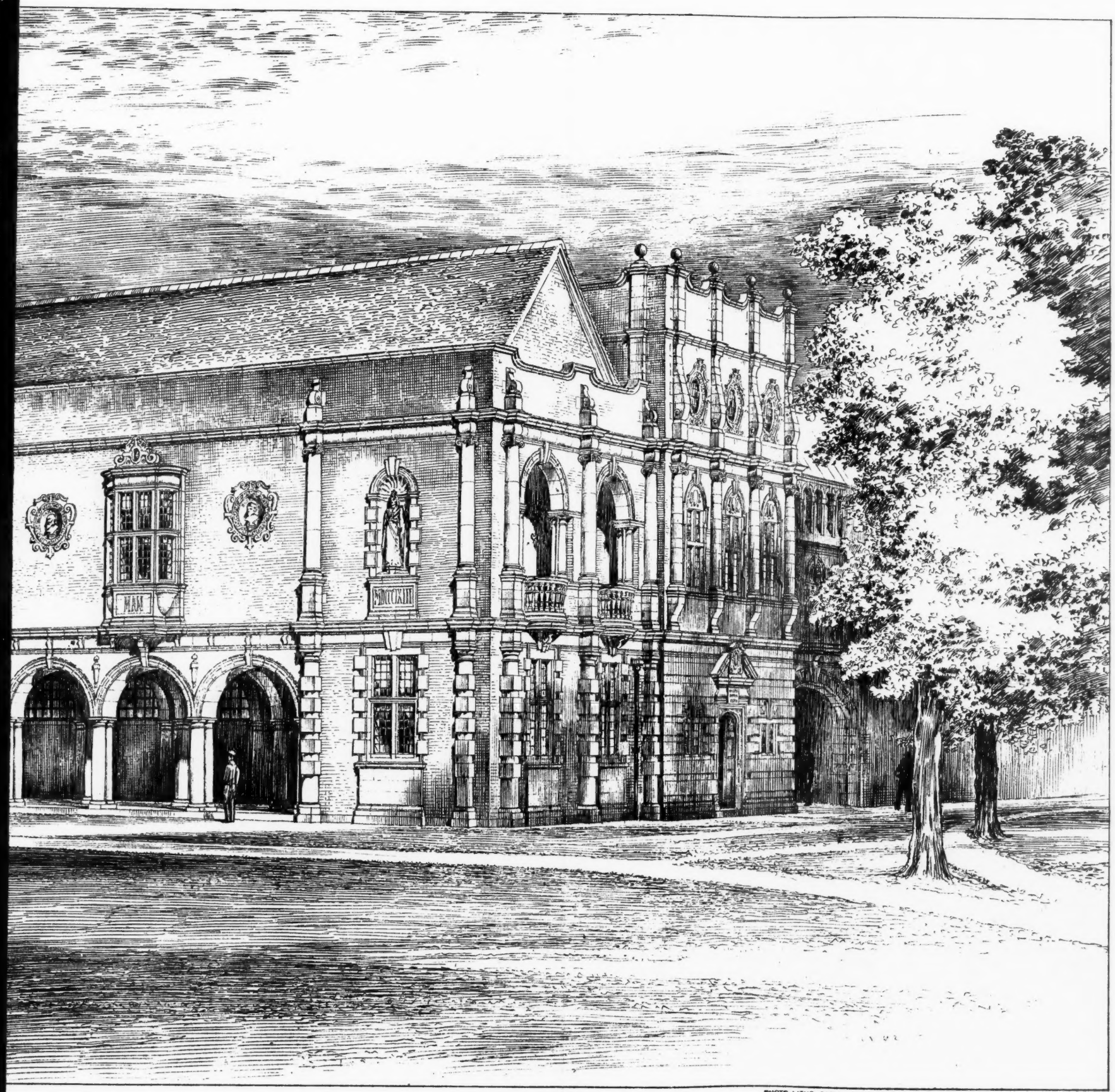

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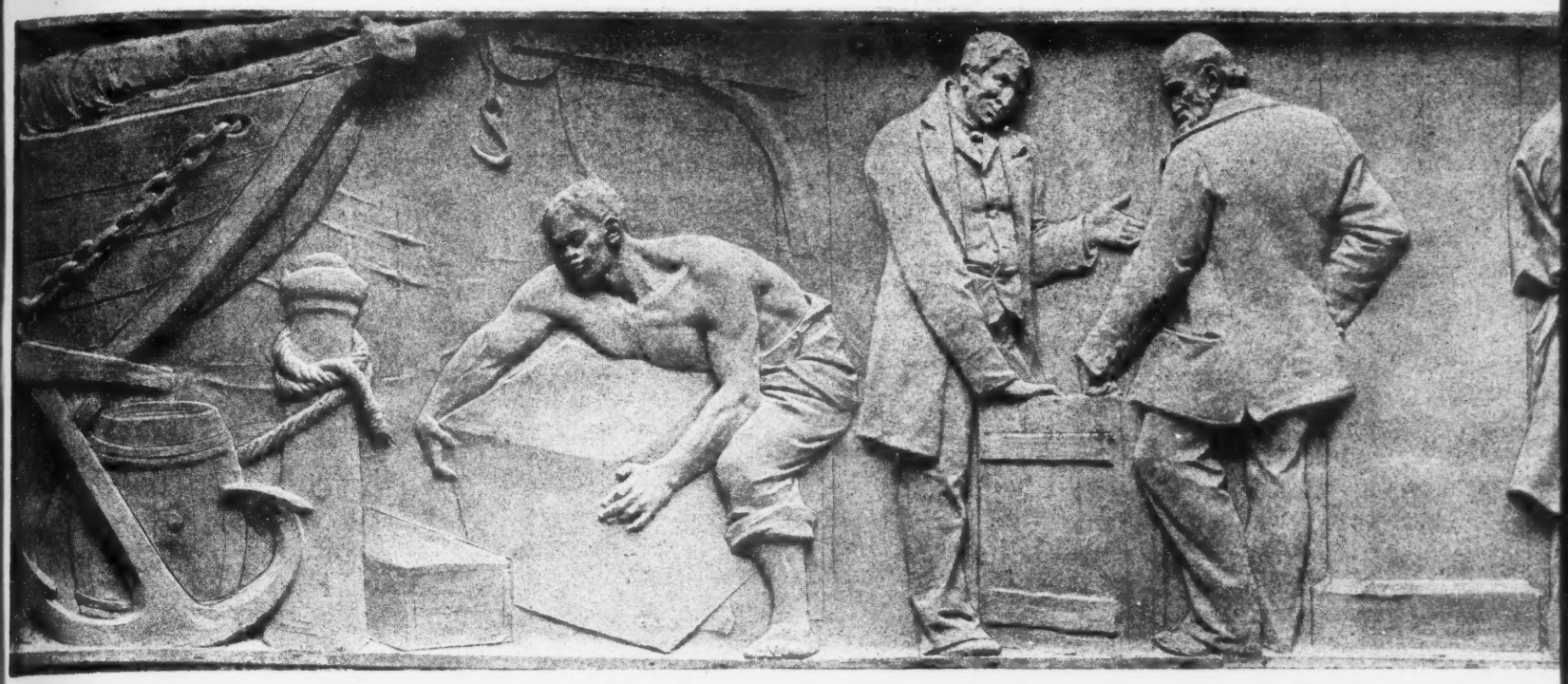

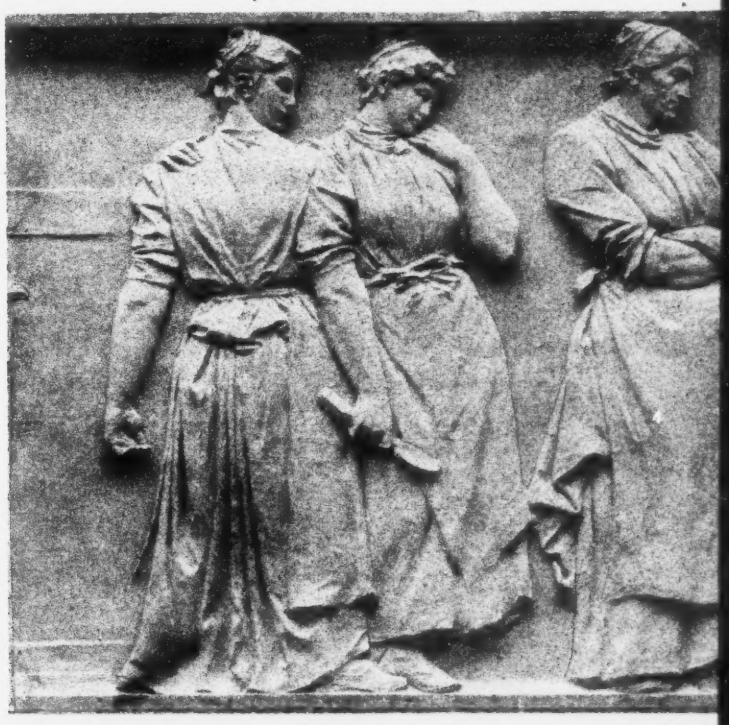

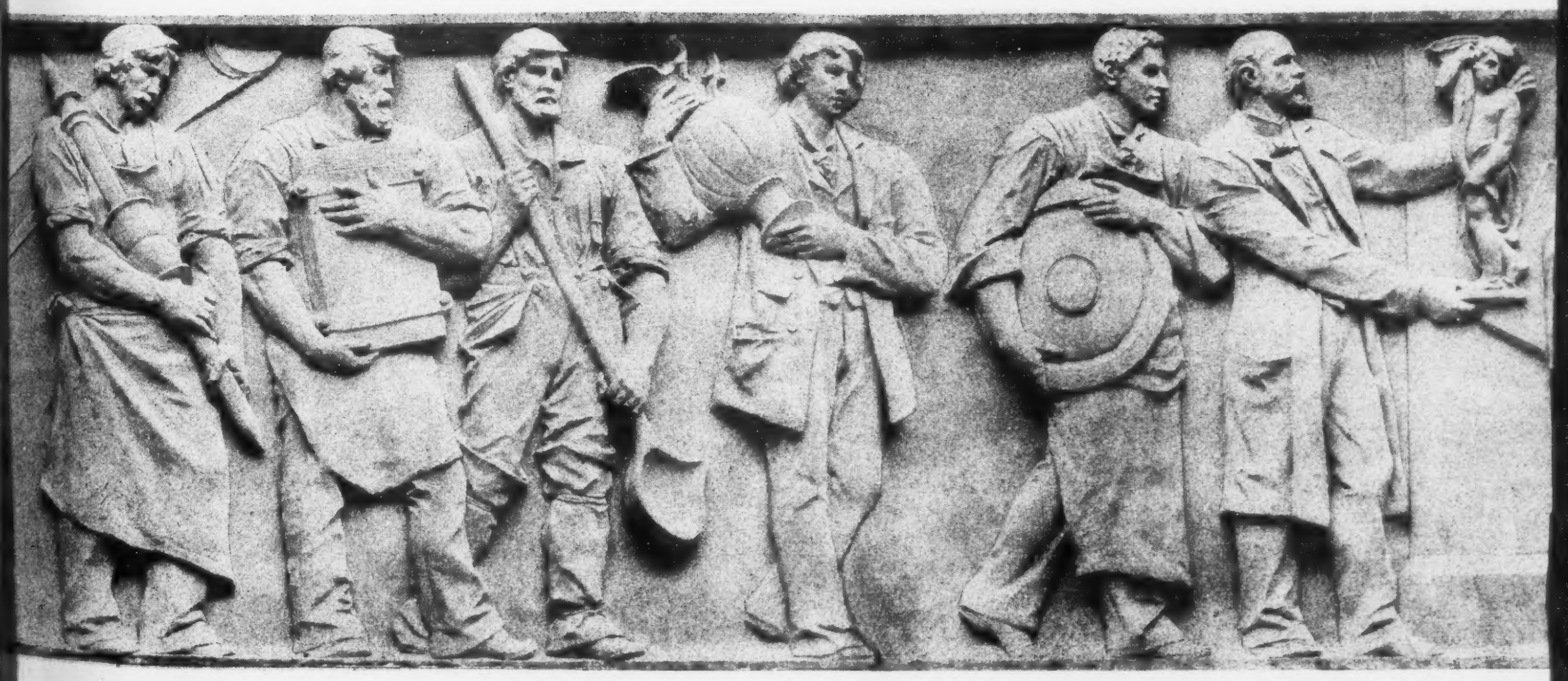

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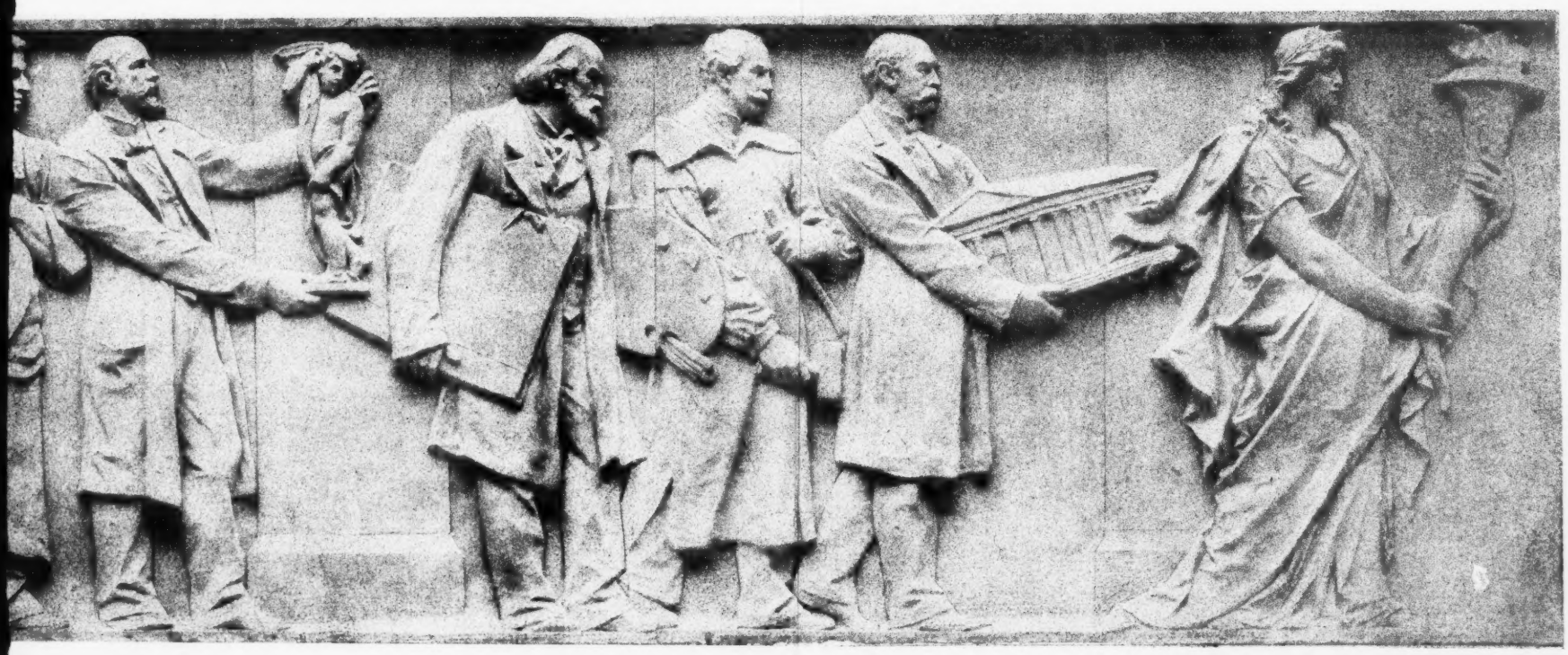

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FTS OF SHEFFIELD, AT THE NEW TOWN HALL, SHEFFIELD.—Mr. F. W. Pomeroy, Sculptor.